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* Please read "McWatters, M. R. C." in place of "R. N. Banerjee."

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* Please read "McWatters, M. R. C." in place of "Banerjee, R. N."

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THE

Indian Medical Year

Being a review of the progress of Medicine, Surgery and Public Health in India during 1927

EDITED BY

Lt.-Col. R. KNOWLES, I.M.S.

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SUPPLEMENT.

THE INDIAN MEDICAL YEAR, 1927.

A REVIEW.*

IN reviewing the Indian Medical Year, 1927, the reviewer would like once again to express his most grateful thanks to the numerous contributors who have helped to make this review a symposium by different writers, rather than a review by a single reviewer.

Undoubtedly, the most important medical event of the year in India was the very successful Seventh Congress of the Far Eastern Association of Tropical Medicine, held in Calcutta from December 5th to December 10th, 1927. This has been so fully dealt with in our columns elsewhere, however, that in the current article we shall only make occasional and passing references to it.

DISEASES OF THE TROPICS, EPIDEMIOLOGY, SYMPTOMATOLOGY, AND TREATMENT.

MALARIA.

The most interesting event of the year was the visit paid in January by Sir Ronald Ross to Malaya and Assam, and the opening by H. E. the Governor of Bengal on January 7th of the Ronald Ross Gate of Commemoration close to Sir Ronald's former laboratory at the Presidency General Hospital, Calcutta. A full account of this ceremony was given in our issue for March, and we are glad to say that a copy of this and of the photographs concerned has now been enshrined in the Wellcome Museum of Medical History. An account of Sir Ronald's visit to Malaya and Assam has subsequently been published by him, and was reviewed in our issue for December; the moral of it appears to be that it is the big commercial industries of India which are setting the lead to-day in malaria control, whilst municipalities and district boards tend to lag behind, chiefly for financial reasons. It is often said that India has made less use of the great discovery which Ross made within her borders than any other country; but this is simply not true; finances have been so stringent that more could not be accomplished. At the present time it would appear that the want of men is even more urgent than the want of funds, and that special efforts should be made to train up malariologists for the future needs of India. (At the same time it is amusing to reflect that the mosquitoes were especially troublesome and vicious in the *shamiana* which was erected for the opening ceremony at the Gate of Commemoration!)

We regret extremely the very serious illness which subsequently prevented Sir Ronald from coming out to India in December to the F. E. A. T. M. Congress as the guest of the Government of India, and trust that he will soon be restored to his customary vigorous health.

A still further event in connection with Sir Ronald Ross' great discovery has been the finding of certain missing letters in the Ross and Manson correspondence during the period of Ross' investigations, and their publication in our issue for August, as well as in other medical journals. These letters were found among the effects of the late Sir Patrick Manson.

Epidemiology and Prevention.—In this connection a large number of papers have to be dealt with. Perhaps the most interesting of all is the admirable memoir by Mr. Senior-White and Dr. Williamson in our issue for January, 1927, on the future of anti-malarial research. In reviewing this paper Col. Clayton Lane writes: 'It is quite impossible to give any adequate extract of this paper. It deals with the monetary benefits which must follow successful research. It emphasises the steps which led to the costly and unnecessary elevation of quinine to prominence among the cinchona alkaloids; to the need of local study of anopheles; to the cost of oiling and subsoil drainage.....; to the effect of peaty and mineralized waters on larvæ, which opens up an enormous field of investigation; to our great ignorance of the normal life processes of plasmodium and mosquito.....; to ignorance of the plankton food of mosquito larvæ of different species; and to many other matters of primary importance, if the malaria problem is to be solved. The paper is sure to be widely read and deeply studied.' The enthusiast is rare, the successful enthusiast still rarer. Enthusiasm by itself is blind, and imagination, penetration and sound inductive reasoning are required.

Dr. C. Strickland's malaria survey of the tea gardens of Assam has been completed, and the results published (in an abridged form) by the Indian Tea Association in a brochure which we hope shortly to review. In Assam, as elsewhere, each locality would appear to constitute a problem in itself; there is no royal and straightforward road to the extermination of malaria, and what suits one area may be quite unsuitable for another. The same author, with Dr. K. L. Chowdhury has published the results of an anopheline survey of Bengal—a paper which will be of interest to all public health workers in rural Bengal. Major G. Covell and Sub-assistant Surgeon J. D. Baily publish a report on a study of the malaria of the Andamans with special reference to the spleen rate. This constitutes a practical application in the field of Christophers' new and accurate method of estimating the true size of the enlarged spleen. The normal path of enlargement of the spleen in adults was found to correspond with that in children. In the case of both adults and children the percentage of parasite infections increases as the spleen enlarges. The gametocyte output (crescents) is not associated with immunisation, but the reverse. An unusually high prevalence of quartan malaria is noted in the Andamans, and is associated both with acute and chronic malaria. Finally, Sinton's method of enumeration of parasites by means of a standard suspension of the red blood corpuscles of the fowl was found to be convenient and easy of application under field conditions. The whole paper, in fact, consists of an application of recent and more exact methods to the study of malaria in the field.

Lieut.-Col. C. A. Gill contrasts his (sixth) annual forecast of malaria in the Punjab for the year 1926 with what actually happened. The method is based on the hypothesis that malaria epidemics are the outcome of a loss of equilibrium between infection and immunity, together with a study of the climatic factors concerned, especially of the rainfall during the earlier part of the monsoon, and the humidity index. Three districts, Jullundur, Ludhiana, and Hoshiarpur, were picked out as areas in which malaria was likely to become intense during the monsoon of 1926, and high epidemicity was also likely to occur in Sialkot and Amritsar. In general what actually happened tallied very closely with the forecast, but two discrepancies were noted; Lahore had much less malaria than was anticipated, and in Gujrat and Gujranwala an unexpected outbreak occurred in association with a rainfall which was definitely unfavourable to the occurrence of an epidemic; these latter areas need special investigation. A curious result of the publication of

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* *Notes.*—(1) Unless otherwise mentioned, the commissioned officers referred to are all members of the Indian Medical Service. In order to save space, references to qualifications, appointments, titles and decorations have been omitted, except in a few instances.

(2) The reviewer has been much exercised in mind whether to include abbreviated references to the papers cited, or to append a bibliography, but has decided that to insert references would mar the continuity of the text, whilst to add a bibliography would make this supplement unduly long. The references concerned, however, have been filed, and we shall be glad to supply any enquirer with any special reference wanted.

(3) Extra copies of this supplement are available at Re. 1 each from Messrs. Thacker, Spink and Co., P. O. Box No. 54, Calcutta.

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Col. Gill's forecasts has been that the *Statesman* of Calcutta has taken him to task, and considers that 'it is both unusual and wrong for health authorities to issue forecasts regarding the occurrence of epidemics as if they were crops or the monsoon.' We confess that we had not suspected the existence of 'fundamentalists' in the office of the most enlightened daily paper in India. If public health workers are not to be allowed to attempt the intelligent anticipation of epidemics and to take measures beforehand, we may as well abandon all attempts at preventive medicine in this country, and leave it to 'the sweet reasonableness of Nature' to kill off the excess population by famine and epidemic disease. Anyhow, the Meteorological and Agricultural Departments are allowed forecasts; so why not the Public Health Department?

From the United Provinces, Lieut.-Col. C. L. Dunn forwards the following notes on malaria in the provinces by Capt. D. Clyde, Assistant Director of Public Health (Malariology), U. P.

Anopheline mosquitoes in the United Provinces.—An investigation of the anopheline carriers in the United Provinces is being undertaken, specimens being sent in to the central laboratory by the Medical Officers of Health, District Medical Officers of Health and their assistants. All these medical officers possess a qualification in medicine and public health. It is obvious that this system of investigation is unlikely to yield results commensurate with the cost. The results cannot be taken as an indication of the officers' knowledge, but are probably due to the fact that the work of collecting mosquitoes is delegated to subordinates. Officers were requested to catch and despatch only adult anophelines and were asked to obtain these from different places in the municipalities and districts. Special attention was drawn to the fallacy that once an area was located where anophelines were plentiful, there was a tendency to send in large numbers of mosquitoes from that area and this resulted in an enormous number of *A. rossi* being sent in.

Results.

Total number of anophelines sent in.	Number of *A. rossi* among these.	Number of anophelines other than *rossi*.	Other insects sent in as anophelines (of which 75% were *Culex*).
21,897	21,405	492	16,452

The investigation is now carried out by sending out laboratory attendants who have been trained to eliminate *Culex* and *rossi* from their catches. Of the mosquitoes which they would discard as *A. rossi* a percentage is retained and sent in for examination so as to eliminate possible fallacies.

Species of anophelines in the United Provinces.—The following species of anophelines have been recorded up to date in the United Provinces. The number in brackets gives the number of districts out of 48 districts in the Province from which specimens have been recorded. The data is of necessity incomplete and is not based on uniform large catches in all districts:—

A. listoni (20), *A. culicifacies* (32), *A. willmori* (17), *A. maculatus* (16), *A. maculipalpis* (21), *A. stephensi* (22), *A. pulcherrimus* (4), *A. hyrcanus* var. *nigerrimus* (18), *A. barbirostris* (14), *A. subpictus* (25), *A. fuliginosus* (21), *A. minimus* var. *varuna* (2), *A. turkhudi* (3), *A. jamesii* (2), *A. lindesaii* (4), *A. gigas* (4).

Correlation of meteorological data and malaria.—It would appear from an attempt to work out the correlation between the statistics of districts (rural areas) over a period of years, and dealing with (1) average annual rainfall, (2) percentage of cultivated area irrigated by canals, (3) ratio of area under wet cultivation to total area under cultivation, and (4) deaths from malaria as a percentage of total deaths, that no definite correlation appears to exist and that the statistics under each head are liable to such great errors that they would render any standard factor of correlation useless in any case.

Bhim Tal malarial survey.—A malarial survey of Bhim Tal was performed in May and June 1913 and October 1913 by Major Graham, I.M.S., and certain anti-malarial measures were carried out subsequent to this. A survey of the area was again carried out in May and June 1927 and is being reported upon in detail, but from this the following results appear:—

(1) Malaria has increased in Bhim Tal.

(2) The increase is chiefly due to the fact that the network of *kutcha* drains in the low lying grounds to the north of the lake are improperly kept and have become excellent breeding grounds. The larvæ from this area alone bred out into *A. listoni*, *A. willmori*, *A. maculipalpis*, *A. maculatus* and *A. fuliginosus*.

Kashipur malarial survey.—Malarial surveys of several areas in the U. P. Terai have in previous years been carried out and a malarial survey of the Kashipur Tahsil of the Terai and Bhabar was carried out in March, April and May 1927, with a view to determining the cause of the decrease in population in this area. The population has decreased from 71,412 in 1872 to approximately 35,000 in 1927. The average birth-rate for 46 years was 35.99 and the average annual death-rate 45.30. The provincial death-rate for this period was 35.23 and the provincial birth-rate 39.38 per mille.

The survey included 83 villages in a greatly depopulated and waste area of 189 sq. miles. Taking only the rural area figures and excluding the results of the surveys of the towns, out of 1,756 children between 2 and 10 years of age examined (excluding sick children) the splenic index was 49.88 per cent. Out of 1,136 blood slides from these children 18.92 per cent. showed malarial parasites of which 73.4 per cent. were M. T., 22.9 per cent. B. T., 1 per cent. quartan, and 2.7 per cent. mixed infections.

The anopheline mosquitoes found were *A. fuliginosus*, *A. listoni*, *A. maculipalpis* var. *indiensis*, *A. maculatus* var. *dravidicus*, *A. culicifacies*, *A. hyrcanus* var. *nigerrimus*.

No oöcysts or sporozoites were found in 270 anophelines examined. (Approximately equal numbers of *A. listoni*, *culicifacies* and *maculatus* were dissected.)

After allowing as far as possible for the fallacies in the statistics (which are available for a period of 46 years) and correlating the survey work done, it is estimated that approximately 60 per cent. of all deaths in the Tahsil are due to malaria. Only 5 per cent. of the villages were found to be healthy (spleen rate under 10 per cent.); 14.4 per cent. were found to be moderately endemic; 18.0 per cent. were highly endemic, 62 per cent. were hyper-endemic.

Leaving out the tract where malaria is due to natural conditions such as the proximity of breeding-places in the ravines and jungle to habitations, by far the greatest if not the only factor of importance is the system of *guls* from the canals which account for the breeding-places of all the carrier anophelines found. The rise and fall in the population of Terai villages would appear to be to a great extent due to a vicious circle: decline commences with some deaths in the malignant malaria season, over-irrigation of the fields becomes more and more marked as the population decreases and the water is allowed to flow over the now uncultivated areas, malaria increases until ultimately the village is deserted by the remaining inhabitants. After a period of years settlers again come and begin by re-digging the old *kutcha guls* thus bringing malaria up to the *abadi*. Whether they also desert the area or die, or the village again becomes prosperous depends on the excess or scarcity of the irrigation water. Cultivation only means no malaria in as far as it means no waste or excess or irrigation. The remedy for this tract of the Tahsil would appear simply to be the fitting of regulators on the outlets from the canals and controlling the irrigation carefully.

Immunity among Tharus and Bhuksas.—It is pointed out that the Terai tribes of Tharus and Bhuksas who have been stated to have a relative immunity to malaria as long as they remain in the infected area but die on their return to the area after emigration, live as a rule in thin-walled dwellings as against the thickly-walled

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huts of other cultivators, that a large diurnal variation of temperature exists over the whole area where the tribe is found, that they are wealthier and possess more cattle than the indigenous cultivator and tend to keep their cattle in byres surrounding, and at some distance from the village huts, that adult carrier anophelines are seldom found in houses but in large numbers in byres, that the splenic index under 10 years of age among Bhuksas is not notably less than among other classes and that the splenic index above the age of 10 years is much less than in other cultivators of corresponding age periods. Another difference is that Bhuksas and Tharus eat fish as a staple article of diet and consume alcohol.

Dr. S. L. Hora, D.SC., of the Zoological Survey, pleads for an increased use of mosquito larva eating fish, and for closer co-operation between the Public Health and Zoological Departments. The only Fishery Department in India which now deals with this problem is that in Madras, but even here there is but little demand for larvicidal fish. The available literature on the Indian species of fish concerned is cited, and instances given of the value of fish control. A comment is also made on the bad habit of the Fishery Departments in introducing into tanks larger predaceous fish which prey on the larvicidal species. S. L. Sarcar gives an interesting account of an ancient flush and flood scheme in connection with the ancient ruined city of Gour in the Malda District. In 1922 the inhabitants in a part of this area surreptitiously cut the *bunds* which controlled the rivers, and flooded their lands in order to grow paddy; the result has been a steady diminution of malaria in the flooded areas. M. V. Perumal records cases of indigenous cases of malaria occurring at the high altitude of Coonoor, 5,500 to 6,000 feet, a dhoby ghat in a valley in the station being apparently chiefly responsible for the carrying of anophelines. Lieut.-Col. L. Reynolds has a useful note (*R. A. M. C. Jl.*, Vol. 48, p. 302) on a method of erecting mosquito nets at very cheap cost by means of wiring in hospital wards and barracks—a method which we understand is now coming into general use in Indian military hospitals.

Only a few of the published papers of the year deal with the *symptomatology* of malaria. With regard to *diagnosis* Dr. Neave Kingsbury reports on a study of the complement fixation reaction.

"None of the complement fixation tests employed for such chronic affections as tuberculosis, hydatid disease and schistosomiasis have proved comparable with the Wassermann reaction, but, by reducing the dose of complement to a minimum and by employing a suitable antigen, some success has been obtained. In such conditions the efficacy of the test centres round the discovery of a sensitive and highly specific antigen of low anti-complementary power. Eleven antigens were tested, eight from the spleen, liver, heart, brain and blood of a subtertian infected patient who died comatose after a single quinine injection, and three from the blood of one, 1|16th of whose corpuscles were infected with *P. vivax*. The most satisfactory antigens were saline emulsions of washed and lysed blood. The results these gave were as follows. Of subtertian malarias, 25 were tested with *P. falciparum* antigen and 48 per cent. were positive (graded as 1 to 4); while 16 were tested with *P. vivax* antigen with 31 per cent. positive. Again, of tertian malarias, 12 were tested with *P. falciparum* antigen with 50 per cent. positive, and six with *P. vivax* antigen with 67 per cent. positive."

Treatment.—Major J. A. Sinton has continued his studies in the treatment of malaria. In conjunction with Major W. Bird, R.A.M.C. and Assistant Surgeon S. N. Eate, I.M.D., he finds Peracrina of little or no value. 'Even if Peracrina 303 has a beneficial effect in chronic malaria, the cost, the length of treatment required and its uncertainty make it unsuitable for routine use as compared with quinine. Twenty-five cases of chronic benign tertian malaria were treated by intravenous injections of sodium stovarsol, varying doses up to a total of 4 grms. being given in five days. The intravenous injection of 1 grm. will cause the temporary disappearance of *P. vivax* from the peripheral blood and a 'clinical cure' in the majority of cases, but there is only a very small percentage of true cures, and the drug has not as rapid an effect in reducing the size of the enlarged spleen as have the cinchona alkaloids. Further, the primary injection of sodium stovarsol may have a provocative action and produce febrile symptoms in an afebrile patient, whilst toxic symptoms may follow the administration of the drug. Whilst it may have a limited value in the rare cases where the cinchona alkaloids cannot be tolerated, its rôle is markedly inferior to theirs.'

Lieut.-Col. A. H. Proctor deals with the 'treatment' of malaria as carried out in *mofussil* dispensaries in this country. A patient who does not bring a bottle for medicine with him only gets one dose of quinine, and even a patient who brings a bottle only receives three doses. He estimates that 92 per cent. of malaria patients attending dispensaries do not receive sufficient quinine to cure their fever, and this especially tends to bring 'Western' medicine into disrepute. In one dispensary investigated it would have cost Rs. 720 per annum to give every malaria case 90 grains of quinine; the total actual annual allotment for dressings, instruments, and drugs was Rs. 500, of which Rs. 288 per annum was expended on quinine. How is this state of affairs to be remedied, he enquires; the answer is not easy.

An interesting correspondence has taken place in the *British Medical Journal* on 'quinine resistance' in malaria. 'I.M.S.,' writing from the Punjab, and clearly with a very large experience, notes that in practically all unyielding cases the urine showed no quinine, in other words the quinine prescribed had either not been taken or had not been absorbed. These cases at once yielded to quinine when administered under strict supervision. There appears to be evidence that the hydrochloride or bi-hydrochloride is much better absorbed than the relatively less soluble sulphate.

Col. F. de Mello, Director of the Medical Services, Nova Goa, with H. M. P. Vernecar report that they have found Smalarina (Cremonese) to be useless in the treatment of malaria. In six cases treated as far as possible the full treatment of 120 tablets in 30 days was adopted. Nausea, vertigo, and even vomiting and headache resulted, and the drug was of no value, quinine and arsenic having to be given afterwards.

Several papers published in India during the year deal with Plasmochin. The most important is that by Dr. W. Fletcher and K. Kanagaraver, D.T.M. (Bengal) from the Institute for Medical Research, Kuala Lumpur, F. M. S., published in our issue for September. In all these workers treated 97 patients who were throughout under close supervision in hospital, blood films being examined daily. Of these 46 were cases of benign tertian malaria, and in these parasites disappeared in every case, except one, on the fourth day of treatment. In 10 cases of quartan malaria treated parasites all disappeared by the fifth day of treatment. In sub-tertian malaria (29 cases) the results were disappointing, but the manufacturers themselves emphasize the necessity in such cases of combining quinine with the plasmochin therapy, and their claim that plasmochin has a direct lethal effect on the gametocytes of *P. falciparum* was well borne out in the series, no crescents being seen after the seventh day of treatment. Further, the drug is tasteless, and is easily taken. On the other hand it is not always free from toxic symptoms, and these authors consider that its administration should be confined to hospital patients who are under full observation. Several cases of relapse were seen after plasmochin treatment, but the conditions of the experimental trial were such that it was impossible to compare the incidence of relapses after plasmochin treatment with that after quinine treatment. On the whole, it may be said that plasmochin is a valuable secondary line of treatment in malaria, but it does not appear to be of equal value to the standard quinine treatment; perhaps it represents a big step forward towards the ideal of a drug which will efficiently and rapidly cure malaria in a few doses only.

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Drs. B. G. Vad and G. B. Mohile of the Sir J. J. Hospital, Bombay, on the other hand, are loud in their praise of plasmochin. After treating 16 cases they are of opinion that the blood is completely sterilised of parasites in from 24 to 48 hours; that it has a specially marked parasiticidal effect on the crescentic gametocytes of *P. falciparum;* and that 'the days of quinine are numbered.' 'Plasmochin is for malaria what Bayer 205 is for trypanosomiasis.' On the other hand, D. K. L. Basu Mallik is much less confident of the non-toxicity of plasmochin, and draws attention to the report of a death following its use in the annual report for 1926 of the United Fruit Co., U. S. A.

A special feature of the year 1927 with reference to malaria in India has been the number of special *publications* dealing with this subject. Priority of place must be given to the sumptuous memoir on *Malaria in India* by Major-General Sir Patrick Hehir, I.M.S. (retd.), published by the Oxford University Press, and recently reviewed in our columns. This is a compilation which includes information on every possible aspect of malaria in India culled from a thousand and one different sources, and splendidly illustrated. A second but less ambitious book is Knowles and Senior-White's *Malaria in India, its investigation and control, with special reference to Indian conditions.* This represents an attempt to put together into compact and yet fully illustrated form the information required by field and laboratory workers on malaria and malaria survey work. It has been favourably reviewed on the whole; the *Journal of Tropical Medicine and Hygiene*, the *Bulletin of Hygiene*, *Nature*, the *Lancet*, and the *Journal of the Royal Army Medical Corps*, amongst other journals, have been very favourable. On the other hand the chief criticism passed—especially by the *Bulletin of Entomological Research* and by the reviewer in the *Pioneer*—has been that the book contains very little original matter. This criticism, which is perhaps not altogether a legitimate one, rather misses the point; the book was not intended to present original and research matter, but to serve as a vade-mecum for field workers, and to summarise in compact from knowledge which has already accumulated.

Other publications during the year reflect the renewed activity of the Central Malaria Organisation under the Indian Research Fund Association at Delhi. These include first a very valuable memoir by Major G. Covell on the distribution of the anopheline mosquitoes of India and Ceylon. In reviewing this monumental work, Col. Alcock writes, 'the less showy part of the work must have demanded an infinite amount of toil—labour of the kind that brings its physic only to the man of inflexible resolve.' It represents, in brief, a standard work of reference for all malariologists in India and Asia, most carefully compiled, and very finely illustrated. Still another of the *Indian Medical Research Memoirs* (No. VII) by the same author is a critical review of the data regarding the transmission of malaria by the different species of *Anopheles;* with notes on their distribution, habits, and breeding-places. Again, Major Covell has placed the whole medical profession and public health services of the country under a great debt of obligation to him for this careful, detailed, well-indexed, and copious review; it forms a foundation with regard to what is already known—a foundation on which investigators of the future will build; not the least welcome feature of it is its extensive bibliography. It is work well worth doing, and well executed.

A further publication of the year in India is the *Synoptic Table for the Identification of the Anopheline Mosquitoes of India* by Col. S. R. Christophers, F.R.S., Major J. A. Sinton, and Major G. Covell, published by the Government of India, Central Publication Branch. 'This useful key,' writes Col. Alcock, 'is well lubricated with explanatory notes, definitions of topical terms, and figures of specific features.' A still further publication of the year is Dr. C. Strickland's illustrated key to the identification of the anopheline larvæ of India, Ceylon, and Malaya, which has also been favourably reviewed by Col. A. Alcock. He writes 'this excellent book, the doctrine of which is that for the medical man and sanitarian, the identification of anopheles larvæ in the field is a great economy, contains besides the means of identifying them, a canon and complete ritual of the science and art of manipulating anopheles larvæ ..... also there is for workers situated in the Orient a series of keys, all of simple construction and plainly illustrated by enlarged drawings, by which the larvæ of the species of *Anopheles* inhabiting India, Ceylon, and Malaya can be identified severally.'

Finally, a publication of special value is Dr. H. F. Carter's monograph on malaria and anopheline mosquitoes in Ceylon. This has been reviewed at length by Dr. P. A. Buxton, Entomologist to the London School of Tropical Medicine, in the January 1928 issue of the *Tropical Diseases Bulletin*. The original paper is so detailed, so splendidly illustrated, and so comprehensive that it defies analysis. The effects of altitude and rainfall become especially apparent in this report, also of local irrigation and the reverse. The report is of very great value to all malariologists, and we can only refer them to it in the original.

B. S. Chalam, who is in charge of the anti-malarial measures in connection with the Back Bay Reclamation Scheme, Bombay, reports on the possibilities of Paris green as an anopheline larvicide, his article being illustrated by drawings of the different apparatus used. He concludes that Paris green deserves much more attention as a larvicide than it has hitherto received in India. Its cheapness, effectiveness—even in the presence of thick vegetation—and its simplicity of application are entirely in its favour. It is a pure larvicide, however, and has no action on *Culex* larvæ or on the eggs and pupæ of *Anopheles*. As long as one keeps to windward of the spray Paris green has no toxic action on the persons using it as a spray.

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Perhaps we have paid special attention in this year's review to malaria, but, after all, it is the most important disease of the tropics. And from every source, whether official or non-official, we gather a general impression that India is now very fully alive to the vast importance of this disease in her general mortality, and still more in her general morbidity. Money has been tight of recent years—admittedly, but the finance departments are now more inclined to be generous. What we now want are the *men*, and where they are coming from one cannot at the moment see. However, there are big organisations either in being in course of development, or in embryo. And, if one may attempt to summarise the present state of affairs, it would be to remark that the present methods of malaria control are too expensive for so poor a country as India. But there may be other, cheaper, more effective, biological methods; we need two things especially, the further prosecution of research, and the further application in our present-day public health policy of the results already achieved by previous research work.

In connection with *blackwater fever* Lieut. T. W. Twells, I.M.D., reports an interesting case. The patient was a European male missionary with previous Army service in Mhow and Nowshera, and he had also visited the hill stations in South India and Mussoorie. He had been in India for only six years, was aged 25, and had never had any sign of malaria. In 1926 when at Roorkee near Poona he suddenly contracted blackwater fever, with *P. falciparum* present in his blood films. He had never taken prophylactic quinine and this was apparently his first infection in India with malaria. Under cautious quinine therapy the condition of blackwater cleared up, and the patient was subsequently invalided out of India. The author asks for information with regard to similar case-histories of 'first attacks.'

PLAGUE.

Epidemiology.—Perhaps the most important publications of the year are the two papers by Dr. Fabian Hirst of Ceylon, summarising his well-known work of

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several years on the epidemiology of plague as studied in Colombo; also his further paper, which is largely a review of that work, read before the Royal Society of Tropical Medicine and Hygiene. In 1913 Hirst discovered that *Xenopsylla astia* was the sole rat flea of the two principal plague-free cities of the Orient, Madras and Colombo. He considers that *X. cheopis* was introduced into Colombo in 1914, and has only to be introduced into Madras for plague to become endemic there. Plague is not merely a disease of rats and man; it is also a disease of the transmitting flea, whose proventriculus becomes blocked with a solid growth of *B. pestis*, so that the flea cannot feed again until this plug has been ejected. The vitality of plague-blocked *astia* appears to be definitely lower than that of *cheopis* under similar conditions, and its mortality rate greater; hence it is a vector of low efficiency. *X. astia* can transmit however when climatic conditions are favourable to it; and Hirst concludes his first paper by a consideration of the possibility of forecasting plague epidemics in any given area. In his second memoir, Hirst discusses the geographical range and evolutionary history of the different species of rat fleas. The ancestral home of *X. cheopis* was probably the Nile valley, and the incidence of bubonic plague is in general terms greatest where climatic or other conditions especially favour *X. cheopis*. *X. astia* is characteristically a Southern Asiatic species; and the different geographical distribution of the two species is not so much attributable to climatic factors as to zoogeographical ones. When plague first broke out in Colombo the proportion of septicæmic (i.e., non-bubonic) cases seen was high, and the possibility of such cases when transferred to other areas acting as new foci of infection is discussed. Lately, however, the majority of cases have been of bubonic type and less infectivity. Grain containing infected fleas is the greatest source of danger in Colombo, and he concludes 'the prevention of the spread of plague is a problem in applied biology, depending for its solution on an exact and comprehensive study of local conditions and a catholic understanding of the intricate and ever varying relationships between the virus of the disease, the cold-blooded arthropod vector, and its warm-blooded mammalian host.' In general, he concludes that the failure of plague to spread in Europe during the present pandemic is probably due to a retrogression in the area infected by *X. cheopis* just as the appearance of bubonic plague in recent times in Ceylon, Australia, Japan and America is due to the widespread extension of this area by means of rapid transport.

With regard to the United Provinces Col. Dunn sends us the following note:—

The Indian Research Fund Association made a grant of Rs. 20,000 in 1926 for an enquiry into the experimental transmission of plague. Dr. A. N. Goyle, M.B., PH.D., was deputed to undertake this investigation. He has carried out a large number of comparative transmission experiments with *X. cheopis* and *X. astia* which lend support to the view that *X. astia* is a less efficient vector of plague than *X. cheopis*. For example out of fifty-two experiments with susceptible rats in which *X. cheopis* was used a successful transmission occurred in twenty-five, while under exactly the same conditions, nine out of fifty-two experiments with *astia* were successful. Continuous and successive transmission was obtained with eight rats in the *cheopis* cage and with only two in the *astia* cage. The results of both the series of experiments demonstrate the superior efficiency of *X. cheopis* as a vector of plague compared to *X. astia*. An interesting point which emerges from this study is that males of both *X. cheopis* and *X. astia* appear to transmit plague to rats more readily than the respective females of these two species. Evidence has been obtained to show that a rise in saturation deficiency exerts an unequal effect on the plague transmitting power of *X. cheopis* and *X. astia*. It was found for example, that *cheopis* failed to transmit plague at a temperature of 68°F. when the saturation deficiency rose to 0.6 of an inch, whereas at the same temperature *astia* did not carry plague beyond a saturation deficiency of 0.3 of an inch. It is suggested that the flea-species is a factor of considerable importance, though not the only factor involved in the spread of plague, and that the presence of *astia* to the exclusion of all other fleas over a large tract of the country may account for its immunity from plague. The longevity of fleas apart from their host has been shown to depend principally on the drying power of the atmosphere. The males of both the species have a shorter duration of life than their respective females. *X. cheopis* lives longer than *X. astia*.

"Liverpool Virus," which was first introduced by Professor H. E. Annett of Liverpool some 22 years ago and is now manufactured by Messrs. Evans Sons, Lascher and Webb, Ltd., Liverpool, was made the subject of experiment on Lucknow rats. The results obtained do not justify its use in the destruction of rats on a large scale, for out of forty-three rats fed with a varying amount of the virus only eight died within two to seven days and four rats died within eight to ten days. The remaining thirty-one rats were found to be healthy. The label on the tins containing the virus states that "it takes about a week for the rodents to die off." The special plague enquiry at the Haffkine Institute under the Indian Research Fund Association was continued during the year. Dr. B. P. B. Naidu and Jemadar Shamsher Jang, I.M.D., describe successive improvements effected in the constitution of the broth used for Haffkine's prophylactic plague vaccine preparation; the pH values for maximal growth were from 6.6 to 7.0, and the most favourable immunity was shown by rats inoculated with vaccine made from broth with an initial pH value of 6.8. The same authors have studied the production of alkalinity by *B. pestis* in broth cultures; during growth the alkalinity of the culture steadily rises, and reaches a maximum between the fifth and eleventh week of incubation; after an incubation period of 176 days the organisms are still viable and give good sub-cultures on agar slopes. The amount of alkalinity present in the vaccine has apparently no influence either on its toxicity or on its potency as estimated in rats.

Turning to *symptomatology and treatment*, Khan Bahadur Dr. N. H. Choksy has a very interesting account of the pathology of plague, based on his many years experience at the Mahratta Hospital, Bombay. He divides the cases seen into the bubonic type, the septicæmia type, the pneumonic type, and the cellulo-cutaneous type. This last type, he claims, has been overlooked. He concludes that attempts to tinker with one or other drug in the treatment of plague are useless; what is wanted is an efficient anti-serum of high titre. The Rev. Father J. F. Caius, Dr. Naidu, and Shamsher Jang from Parel report on an investigation into the bactericidal action of the commoner phenols and their derivatives *in vitro* on the *B. pestis*. These compounds are relatively insoluble in water, but are soluble in alkalies, and solution in an alkaline medium may either depress or intensify their bactericidal action. Those which were found to be the most active were quinol, mercurochrome, catechol, alpha-nitroso-beta-naphthol, toluhydroquinone, minophenol, carvacrol, and trichlorphenol. Father Caius, Dr. S. A. Kamat, and Dr. Naidu have further investigated the bactericidal action of organic derivatives of mercury on *B. pestis*, testing the action of mercurial derivatives of phenol, trypan red, trypan blue, and acid fuchsine by their so-called 'inhibitory method.' The aromatic mercurials were found to be many more times as active as the compounds from which they were derived. In general the bactericidal power is proportional to the amount of mercury present, and but little change is brought about by modification in the chemical constitution.

R. D. Pal pleads for the much more extensive use of anti-plague serum. Using the serum obtained from the Institute Pasteur, Paris, he gives doses of from 40 to 60 c.c. intravenously morning and evening until the temperature drops to normal. Each injection is followed by a marked increase in the patient's comfort; adrenalin is also given hypodermically, and a stimulant mixture containing ammonium carbonate and digifortis

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(P. D. & Co.) orally. Local treatment of the buboes is of little use, except for hot fomentations, and incision when suppuration has occurred. A small hypodermic dose of morphia with atropine is of real value, giving the patient sleep and a good night, and conserving his powers. A. S. Dawson also strongly advocates the intravenous use of anti-plague serum, giving doses of from 30 to 40 c.c. intravenously with a further 20 to 60 c.c. into the cellular tissues of the abdominal wall or thigh. In many cases the measure appears to have saved life, and in some the most dramatic change for the better was evident within 24 hours. He also administers a mixture containing adrenalin, digitalis, and aromatic ammonia by the mouth.

It seems to be increasingly clear that a really efficient anti-plague serum is badly wanted in India, if it can be manufactured, and we are glad to note that the Indian Research Fund Association have taken up this problem.

From the Haffkine Institute, Parel, Col. Mackie writes as follows:—

Dr. B. P. B. Naidu and Jemadar S. S. Jang, I.M.D., have been experimenting on the production of a potent anti-plague serum. By immunising rabbits with intravenous injections of virulent cultures isolated from the heart blood of plague rats they have succeeded in obtaining a serum of very high agglutinating titre, and the experiments so far carried out show that this serum has very potent curative properties. They find it possible to save an infected rabbit from death even when the serum is administered on the fourth and fifth day of infection.

These workers have also tested the therapeutic value of mercurated trypan blue on twelve rabbits experimentally infected with plague and found it to be of no value. They selected this compound out of 32 mercurated compounds of trypan blue, trypan red and fuchsin by studying their antiseptic action on *B. pestis* and their toxicity to animals.

Dr. Naidu has also continued his enquiry on Haffkine's prophylactic on the lines indicated by him last year.

Bacteriophage.—Dr. C. R. Avari has been engaged on the isolation of bacteriophage for different pathogenic organisms.

After several attempts he has succeeded in isolating a powerful strain of "phage" for *B. pestis*. The preventive and curative value of this phage is being studied. He has also isolated strong strains of phage for dysentery organisms (Shiga and Flexner), for *B. coli*, for *B. pyocyaneus*, and for the gonococcus.

CHOLERA.

Epidemiology.—Most of the published papers of the year deal with this aspect of cholera. Lieut.-Col. F. J. Palmer, R.A.M.C. (retd.), believes that Koch's vibrio is not the true ætiological agent of cholera, but that a cocco-bacillus, which often shows bipolar staining appears to be responsible, at least in Cachar. This may or may not have some association with a small spore-bearing bacillus which is often present, whilst the pig which is so ubiquitous on the tea estates in that area may have something to do with the spread of cholera. We fear, however, that bacteriologists will fail to agree with him.

The question which, as usual, has attracted most attention during the year is the perennial one of the relationship of the true (agglutinable) vibrio of Koch to the morphologically similar non-agglutinable vibrios so commonly found in fæces and in water supplies during cholera epidemics and in the endemic cholera areas. Dr. B. B. Brahmachari of the Bengal Public Health Department claims that non-agglutinable vibrios can be converted into the true agglutinable Koch's vibrio, chiefly by passage through rabbits and on repeated subculture on media: they meantime lose their agglutinability to their own specific homologous serum. This is a very big claim, and if further work confirms it, it marks a very big step forward in our study of cholera. The reverse process—the loss of agglutinability by strains of Koch's vibrio—is a well known phenomenon, but if non-agglutinable vibrios can be really proved to be but mutations of the true Koch's vibrio, then they assume a new importance in connection with the ætiology of the disease; the tendency hitherto has been to regard these non-agglutinable strains as rather degenerated and non-infectious strains of the true vibrio of cholera. The same author has also carried out an extensive series of observations in connection with the carrier question in Bengal. The stools of over 4,800 persons in the endemic areas were cultured, and the total carrier percentage turned out to be only 0.5 per cent.; 6 convalescents or contacts yielded agglutinating vibrios, and 23 vibrios of non-agglutinating type. In a further series of observations in villages near Calcutta 0.4 per cent. of persons examined were true cholera carriers, but no less than 13.7 per cent. yielded non-agglutinating vibrios. The number of examinations upon which these conclusions are based is very large, and the relationship of the non-agglutinating to the agglutinating strains again comes up for consideration. Can seasonal or other factors convert one strain into the other? or passage through the intestinal tract of a suitable person?

In our issue for February, Dr. J. W. Tomb and Capt. G. C. Maitra summarise the results in general of their well known work on cholera under the title 'A new conception of the epidemiology and endemiology of cholera.' Their work is based upon their 'open-bowl' method of cultivating stools, which yields a far larger percentage of positive findings of vibrios than other methods. In the Asansol Mining Settlement from November to February during the cold weather they find that vibrios are so scarce in the water of the ground tanks universally used for bathing and drinking as to be practically negligible. With the onset of the hot weather in March they begin to appear and become very numerous as the season advances, and the brief thunderstorms of that period seem to very greatly increase their prevalence by washing infective material from the sides of the tanks into the water. With the onset of true monsoon conditions, however, in July the vibrionic content again drops. The curve for vibrionic content of these tanks follows very closely that for cholera incidence in the settlement. Primarily, they believe, 'the endemicity of cholera in any locality depends upon the existence in the community of great numbers of (healthy) carriers of non-agglutinating vibrios; secondly, on the occasional conversion in the intestines of a proportion of these carriers by some vital process of the non-agglutinating vibrio into its mutation form, the agglutinating vibrio; thirdly, upon the widespread and continued pollution of drinking water supplies with this mutation form through the unhygienic habits and customs of the people.' In brief, it is the carrier of the *non*-agglutinating vibrio which is the dangerous element. The degree of salinity of the tanks may also have something to do with the persistence of cholera in deltaic Bengal as its natural home.

Interesting as these studies are, they can be paralleled in the case of the dysentery bacilli. There are several points here to be noted. First, that freshly isolated strains which are often non-agglutinable, may become agglutinable after sub-culture: whilst this has frequently been observed with the dystentery bacilli, we believe that Dr. Brahmachari is the first worker to make a similar claim for non-agglutinable vibrios. Secondly, that cholera, although a clinical entity, may not be so with regard to its bacteriology. The recent proposal of Sir Aldo Castellani to divide the group of the dysentery bacilli into true dysentery bacilli, and para- and meta-dysentery organisms, each responsible for bacillary dysentery of different types of virulence, seems to be very apposite in this connection. But the whole position is deserving of much further study. The papers cited, however, show how much importance is being attached at present to the study of the endemic cholera question in India.

A paper by Dr. Lloyd Arnold of Chicago in our issue for August may have some bearing upon this problem. He has been studying the auto-sterilising mechanism of the gastro-intestinal tract from an

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experimental point of view. In healthy dogs the pH of the intestinal contents changes from marked acidity in the duodenum (pH 2.5 to 6.0) to alkalinity (pH 6.8 to 8.0) in the ileum. Along with this goes a very marked increase in the general bacterial content, and the lower down the small intestine the greater the prevalence of Gram-negative organisms. In a febrile dog the change is less marked. An elevated body temperature causes increased alkalinity of the intestinal contents, and climatic factors in India might make such a temporary elevation of temperature a not abnormal event in persons residing in a hot and humid climate. This might explain the value of dilute acids in prophylaxis against cholera.

From Madras Lieut.-Col. A. J. H. Russell and Mr. E. R. Sundararajan, M.A., discuss the possibility of forecasting cholera epidemics from mathematical data. As the control of the first cases in an epidemic and the isolation of all cases, contacts, and carriers is an impracticable proposition in India, is it possible to forecast epidemics from other data to take measures beforehand? Cholera has a definite downward trend in some areas in India and a general upward trend in others for the period of years examined. The most suitable standard of comparison for the current data of cholera deaths is the median values of the corresponding months or weeks of the preceding decade. It is possible by such studies to classify the different provinces of India into endemic and epidemic areas. By means of the epidemic index, it is possible to forecast epidemics two to three months ahead of their actual occurrence, whilst epidemic index graphs give a very clear picture of the movements of epidemics. Thus a constant watch can be maintained against epidemic cholera, preventive measures be taken beforehand if an epidemic is anticipated, or energy and expenditure conserved if a calm period is expected.

From the United Provinces, Col. Dunn sends us a special note on the position with regard to that area.

Cholera research work was carried on during the year by Dr. Saranjam Khan, who was specially engaged for the purpose, the enquiry being financed by the Indian Research Fund Association, at a cost of Rs. 30,000.

The United Provinces of Agra and Oudh suffer from an average of 61,885 deaths from cholera annually (average of last 50 years). Some of the districts, namely Benares, Gorakhpur, Basti, Azamgarh and Gonda, have never been free from cholera for a single year out of the continuous available records for the last 50 years. The question, therefore, arose:—Are there endemic foci of cholera anywhere in the United Provinces? An answer to this question is of considerable practical importance to the Government of these Provinces in fighting cholera. The mere fact of cholera "being never absent from a division over a considerable series of years"* will not suffice to call that division an endemic area of cholera without excluding all possibilities of importation. Now the five districts mentioned above are all especially liable to importation of cholera, on account either of their proximity to the endemic areas of Bengal and Nepal, or of the location of the most important centres of pilgrimage, or of a combination of both these factors. Investigation on the spot was therefore necessary. In the United Provinces, cholera practically disappears during the months of January and February in each year. We carefully investigated every fresh outbreak of the disease this year (1927). There was a complete absence of cholera from the whole of the United Provinces during the month of January, 1927. Every outbreak during the months of February, March and April was due to importation. During the month of May the foci had multiplied and the disease spread from them throughout the province. The United Provinces were invaded from Bengal and also from Bombay, not as is usually supposed by the successive invasion of contiguous districts from East to West, but through the invasion of far and widely separated pilgrim centres. In this connection we have selected as an observation area the most likely one of the possible endemic centres in the United Provinces, and with the help of a laboratory on the spot we are working on the following lines (August 28, 1927).

(1) The examination of whole stools of the healthy population by the "open-bowl" method for the detection of "carriers."

(2) The examination of the sources of drinking water (which are chiefly wells) for the presence of vibrios, and for the variation in their numbers from month to month with a view to find out the "reservoir" of cholera.

(3) The examination of every case of cholera or choleraic diarrhœa occurring in the observation area with respect to the history, clinical symptoms, and bacteriology, in order to find out if the disease originates in this area independently of importation.

(4) If it does originate independent of importation from outside, has it any connection with the vibrionic flora of the water supply or that of the stools of the general population?

The results will be published as soon as sufficient data have been accumulated.

The causes of the frequent outbreaks of cholera in pilgrim centres is another problem we have tried to investigate. Some of these cholera disseminating centres are of world wide notoriety. The question of Hardwar for instance is not only of considerable importance to the United Provinces but is of equal concern at least to the Government of the Punjab in regard to their policy of fighting cholera. With the help of the laboratory on the spot, certain data have been obtained from Hardwar, and a paper was read at the Seventh Congress of the Far Eastern Association of Tropical Medicine in Calcutta.

The gist of the paper was that:—

(1) Cholera is not endemic in Hardwar, but is imported by the pilgrims.

(2) Some pilgrims passing virulent cholera germs come to Hardwar from the endemic areas of cholera, chiefly Bengal. These persons are not what we may call chronic carriers. They either develop the disease on the way and reach Hardwar suffering from fully developed true cholera, or they are in the incubation period, or are convalescing from a recent attack of cholera, or are what may be called ambulatory cases of cholera.

(3) The cholera germs thus imported by these pilgrims find their way into the Har-Ki-Pairi pool and the Esplanade part of the Ganges, chiefly in the sewage of the town and also through the bathing that takes place in the river.

(4) From the amount of pollution thus received as corroborated by chemical examination this water is totally unfit for drinking purposes.

(5) Some of the pilgrims for various reasons drink this water to the exclusion of any other kind of water or in exceptionally large quantities. It is these people among the pilgrims that are usually attacked by cholera.

(6) As on or about the chief bathing day the amount of pollution reached its maximum, and the number of people drinking from the most polluted part is also at its maximum, a very large number of the pilgrims are infected at that time.

(7) As the gathering is soon dispersed many of these people developed the disease on the way or on reaching home.

Symptomatology and Treatment.—An interesting paper on the blood pressure readings in cholera is one by Dr. A. J. V. McDonnell, Medical Officer to the Anglo-Persian Oil Co. His conclusions are: (*i*) that all cholera treatment outfits should contain a sphygmomanometer; (*ii*) that during an infusion blood pressure readings should be taken after every pint infused, and as frequently as possible thereafter until the patient

* Rogers (Leonard). The conditions influencing the incidence and spread of cholera in India. *Proc. Roy. Soc. Med. (Section Epidemiol. and State Med.)*, 1926, July 19, No. 9. Also a paper read on January 28th, 1927, before the Indian Section of the Royal Society of Arts.

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is out of danger; (*iii*) that a pulse pressure of under 20 mm. of mercury indicates the need for a further infusion; (*iv*) that, during an infusion, an increase of less than 4 mm. of mercury in the pulse pressure over the previous reading implies that the infusion should be discontinued; and (*v*) that injections of adrenalin are contra-indicated, as the drug tends to cause a rise in diastolic pressure. A. K. Ghosh writes to enquire whether any of our readers can throw light upon the onset of œdema as a sequel of cholera; his patient developed œdema a week after he had recovered from an attack of cholera; the heart was apparently normal, and the condition yielded at once to oral administration of urotropine.

A very interesting controversy of the year is that between Dr. Tomb and Sir Leonard Rogers in the *Transactions of the Royal Society of Tropical Medicine and Hygiene* with regard to the value of the latter's method of treatment of cholera by infusions of hypertonic saline. Dr. Tomb and Dr. G. W. Thompson plead for infusions of normal—not hypertonic—saline, and claim that hypertonic saline fails to maintain the blood pressure. They further claim that the mortality after treatment only by pills of permanganate is lower than that after either hypertonic salines only, or hypertonic salines plus permanganates. Further, they are of opinion that the administration of opium has a definite place in the treatment of cholera patients when seen before collapse sets in. In reply Sir Leonard Rogers relies upon statistics; he quotes a mortality rate of 59 per cent. with treatment only by rectal and subcutaneous salines, one of 32.6 per cent. with treatment by hypertonic salines only; and one of 20.8 per cent. with treatment by hypertonic salines plus permanganates plus alkalies. The chlorides injected, he claims, combine with the cholera toxins, and these are then excreted by the kidneys. The mortality among cholera cases in the Calcutta hospitals has been reduced to about one-third of its former figure since the introduction of hypertonic salines. To this Dr. Tomb replies by reviewing the earlier literature, and referring to Sellards' successful method of treating cholera by intravenous infusions of normal saline to which 45 gr. of sodium bicarbonate per pint has been added; even intravenous injections of distilled water are of value. To this Sir Leonard replies that he sees no useful purpose in continuing the discussion, that the figures quoted are misleading, and that opinion—as in our opinion, it certainly is—is unanimous in support of the very great value of hypertonic salines.

From China Dr. Alexander Cannon reports on the very great value of Tomb's essential oils' mixture in the treatment and prophylaxis of cholera, and believes that its success lies in the carbolic acid incorporated in the mixture. He concludes 'there is every reason to believe that this treatment saved both Shameen and Canton from a severe epidemic of cholera.' He has also found the treatment useful in cases of food poisoning.

With regard to *prophylaxis*, Col. Russell from Madras writes as follows:—

'The geographical survey of cholera in the presidency was completed during the year and the report now only requires final revision to be ready for publication. Statistics of cholera mortality for the civil population are available only from 1866. The enquiry was based chiefly on these statistics, supplemented by the chronicles and reports of early writers on the subject, and by descriptions of a number of isolated epidemic outbreaks to be found in the Sanitary Commissioner's Administration Reports. The report attempts to give not only a complete and connected history of the different epidemics, but also tries to map out the endemic and epidemic foci, to determine the intensity of infection in different localities, to trace out the course of each fresh epidemic invasion from district to district, to describe its further progress in the districts, and to indicate the influence of such factors as fairs and festivals and meteorological conditions on the spread of these epidemics.

'Field experiments were conducted to determine the relative efficiency of the anticholera vaccine when given subcutaneously and Besredka's Bilivaccin when given by the mouth. This work was carried out in 360 villages with a total population of 647,454. Anticholera vaccine alone was given in 236 villages, and Bilivaccin alone in 52 villages. In the remaining 72 villages the two vaccines were administered side by side, about one-third of the population being given cholera inoculation, another third treated with Bilivaccin, and the remaining one-third being unprotected controls. Every attempt was made to divide the persons living in each house equally into these three groups, care being taken to exclude age and sex factors. The incidence of cholera amongst the immunised and unprotected were carefully noted and the results analysed.

'A high degree of immunity is conferred by both the subcutaneous anticholera vaccine and the oral Bilivaccin. The controls for the former were attacked five to six times more frequently than those who were inoculated twice, and the percentage mortality amongst the attacked was 5.8 times higher in the unprotected group. The controls for Bilivaccin were attacked 5.6 times more frequently than those which received a full course of the vaccine. The percentage mortality amongst those attacked among the unprotected was also nearly twice that among the protected. Statistical analysis of the figures indicated that both vaccines confer a considerable degree of immunity, especially if attacks and deaths occurring within three days after the administration of the vaccine are eliminated, as these persons are already at risk. This seems to be a reasonable elimination. In neither case, however, were the correlation co-efficients obtained as high as those obtained for vaccine lymph as a protective against small-pox. The results of these observations have been published by the League of Nations' Health Organisation in December, 1927.'

DYSENTERY, ENTERIC FEVER, SPRUE, AMŒBIASIS BACTERIOPHAGE.

A study of the figures for the last six years in the annual reports of the Public Health Commissioner with the Government of India (about to be published in a forthcoming book *On the Dysenteries of India* by Acton and Knowles) shows that dysentery is clearly the third most important cause of morbidity and mortality in India, being exceeded only by malaria, and respiratory diseases—including tuberculosis. It is of more importance to India than cholera or plague. Indeed, if terminal fatal infections in such conditions as chronic malarial cachexia, kala-azar, intestinal tuberculosis, etc, with bacillary or amœbic dysentery be included, dysentery may well come to occupy the second place in the mortality rate in India. Yet the disease has never been the subject of any organised Commission of enquiry in this country, and on reviewing the literature with regard to dysentery in India it is remarkable that—from the days of Timothy Lewis, D. D. Cunningham and the early pioneers to those of Sir Leonard Rogers, Lieut.-Col. J. Cunningham and others—the investigations carried out on the disease have always been those by individual and isolated workers. This fact may perhaps be responsible for the very defective teaching with regard to the subject in the medical schools and colleges of India, and for the still almost universal and erroneous belief that amœbic dysentery is of far more importance in this country than bacillary dysentery. This belief is entirely erroneous; for infections with the bacillus of Flexner far outnumber all other causes of dysentery in India.

Perhaps the most important paper of the year is that by A. B. de Castro and V. N. Deuskar in our issue for December on dysentery in the Andaman Islands. A special dysentery ward having been opened of recent years at Port Blair, and special attention having been paid to microscopic and laboratory diagnosis, the results are as might have been expected. Of 582 cases admitted, 351 were cases of bacillary dysentery, and only 231 of amœbic infection. No less than 33 per cent. of chronic latent dysenteric infections were in persons

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who showed no active symptoms of the disease. May and June are the months of maximal incidence, whilst a secondary peak is visible on the curve in October, due to fresh bacillary infections. The bacillary cases were as a rule definitely ill, the amœbic ones not so. Oedema was a marked symptom in cases of chronic bacillary dysentery. Intravenous administration of emetine in cases of amœbic infection was found to have no advantage over intramuscular injection, and did not prevent the tendency to relapses. Stovarsol is reported on as a useful adjuvant to treatment; yatren as of less value. A marked feature of amœbiasis as seen to-day in India is the surprisingly low incidence of amœbic hepatitis, due in all probability to the almost universal use of emetine for all forms of dysentery. A very interesting résumé of post-mortem findings in fatal cases concludes what is a paper which indicates very clearly that the junior medical school in India—so to speak—is assimilating the lessons of the work of recent years upon tropical dysentery: in fact the authors are to be congratulated on a very clear presentment of the facts, and upon their laboratory studies of the disease.

Major J. B. Hance contributes a valuable article on the use of the sigmoidoscope in the diagnosis of chronic dysentery and in assessing the rate of cure, and describes the conditions and lesions met with in chronic bacillary and amœbic dysentery respectively. As he shows, by the use of the sigmoidoscope an accurate diagnosis as to which type of chronic dysentery is present can often be made even in the absence of confirmative laboratory findings. In the diagnosis of chronic types of dysentery the sigmoidoscope has clearly come to stay.

It is perhaps of less value in cases of acute dysentery, where the laboratory diagnosis is usually quite straightforward; but it is of special value in cases of chronic infection of whichever type, and, further, will yield perfectly fresh and suitable material for laboratory diagnosis. Major Hance describes in detail the sigmoidoscopic appearance in chronic bacillary and amœbic infections respectively, and indicates how simple a matter such instrumentation is; previous preparation of the patient is necessary, but a general anæsthetic is not, and examination can be carried out comfortably after a previous injection of morphia and a cocaine suppository.

Kurchi has long been a favourite drug for the treatment of dysentery in the indigenous systems of medicine in India, and has previously been reported on favourably by Major H. C. Brown, I.M.S. (retd.), and Dr. Henry of the Wellcome Bureau of Scientific Research. During 1927 it has been a subject of special study by Major R. N. Chopra, and Drs. J. C. Gupta, J. C. David, and Dr. Sudhamoy Ghosh, D.Sc., at the Calcutta School of Tropical Medicine. The active principles of the bark of the parent plant *Holarrhena antidysenterica* are the alkaloids conessine and holarrhenine. The former having been isolated in a pure state in the form of its tartrate, its general pharmacological actions on the body tissues were investigated, and also its action on free-living protozoa and on *Entamœba histolytica* in culture *in vitro*. When acting upon the vegetative forms *of E. histolytica in vitro* in an alkaline substrate it is as active as emetine; it has but little action on such parasitic intestinal flagellate protozoa as *Trichomonas hominis*, but has a marked action on such coprozoic intestinal flagellates as *Bodo caudatus*. The conessine salts—contrary to what was thought previously to be the case—are very well tolerated when administered hypodermically; in fact are much better tolerated than emetine. They are unsuitable for intravenous administration owing to their depressant action on the auriculo-ventricular bundle of Hiss, but are very readily taken by the mouth. Major Chopra having presented the present reviewer with a small sample of purified conessine tartrate, its administration in 1 grain doses intramuscularly in the treatment of cases of acute amœbic dysentery was tried in six patients. Clinically it cleared up the symptoms rapidly, but was less rapid in its clinical action than emetine. On the other hand it caused far less pain and induration on injection, and the after-examination of the stools appeared to show that the infection had been eradicated. In previous reports the writer has recorded very good results with the oral administration of Burroughs' Wellcome and Co.'s Tabloid Extract. Kurchi Corticis in acute cases of amœbic dysentery. It would appear that here we may be on the verge of the discovery of a really efficient, and very cheap cure for amœbic infections. At least the present position is well worth following up. Holarrhenine has recently been prepared in a pure state in Col. Chopra's laboratory and is at present under experimental trial. The whole rôle and value of *kurchi* —both in the form of a standardised extract for oral administration, and of the purified alkaloids for hypodermic administration—in cases of chronic amœbic infection is, indeed, well worth trying out; and this special investigation is an excellent example of the only possible way in which discoveries of real value in the ancient systems of medicine in India can be incorporated in the ever-growing volume of modern scientific medicine.

Dr. A. Neave Kingsbury and K. Kanagarayer from the F. M. S. report on the use of antidysenteric serum in cases of infection with the bacillus of Flexner. Sixteen cases are reported on and the doses of serum administered were from 100 to 200 c.c. (the injections being given presumably subcutaneously, though nothing definite with regard to this is stated). With regard to bacteriological results in the stools the results were poor; clinically, however, the serum administration appeared to be of definite value. The general benefit derived from serum administration however is not sufficiently striking to label this line of treatment as a specific cure. (It is to be noted, however, that an anti-Flexner serum can at best be but bactericidal, not anti-toxic, as is the case with an anti-Shiga serum, and that much less result is to be expected from such a bactericidal serum alone.)

Three papers deal with the new method of treatment of bacillary dysentery by the oral administration of the bacteriophage of d'Herelle. The most important is that by Dr. W. Fletcher and K. Kanagarayer from the F. M. S. These workers report that bacillary dysentery is three times as common in the F. M. S. as amœbic, and that Shiga bacillus infections are rare; the chief ætiological agent of dysentery in the States being the bacillus of Flexner. Bacteriophage was administered to 22 men suffering from Flexner bacillus dysentery. The results were not satisfactory and the 'phage' did not seem to assist in the cure of the disease. Three of the patients died during the course of treatment, and dysentery bacilli were recovered from the intestine of each at post-mortem culture. These authors conclude, however, that this trial is not sufficient to condemn the treatment by 'phage'; everything may depend on getting a suitable strain of 'phage' virulent for the specific local strain of dysentery bacillus involved. Major R. H. Malone and Major W. Bird, R.A.M.C., from Kasauli report on three sub-acute cases of Flexner bacillus dysentery treated with bacteriophage orally; in two of these there was an immediate beneficial response, and no dysentery bacilli could be recovered on plating the stools 48 hours after the administration of the 'phage': in the third case the stool was not plated on the 2nd day after the 'phage' administration, but proved negative on the 3rd day. Their results, both clinically and bacteriologically, were very encouraging. (It may be mentioned in passing that the 'phage' treatment has been on trial during 1927 at the Calcutta School of Tropical Medicine, and results to date appear to bear out the above contention; some patients appear to do extremely well in it, others do not; and specificity in the 'phage' strain selected would appear to be an extremely important element in success.)

A still further report by Professor d'Herelle and Major Malone appeared in our issue for November. This applies perhaps rather to the treatment of cholera by bacteriophage than of bacillary dysentery. In three

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fatal cases no bacteriophage could be isolated from the stools, whereas in two cases which made a rapid recovery a strong bacteriophage was recovered. In 13 out of 23 cases studied, all of whom became convalescent fairly rapidly, the bacteriophage was isolated in increasing virulence in from 24 to 48 hours after the onset of the disease. Professor d'Herelle indeed goes so far as to attribute the natural cessation of an epidemic to the development of active bacteriophage. At the beginning of the epidemic the bacteriophages which are present in the intestine of the patients are of weak order; by degrees "phages" of increasing virulence are elaborated and when these are in the ascendant the epidemic declines spontaneously. Finally, to check an epidemic he suggests the prophylactic inoculation of infected water supplies with a strong strain of "phage," which would be self-propagating, and would even survive in a dried-up well. Such suggestions, the value of which it remains for the future to decide upon, appear to hold out entirely new and tremendous possibilities in the control of epidemic intestinal diseases. The cholera vibrio and the dysentery bacilli are certainly not "natural" inhabitants of water supplies, and if suitable "phages" which are predatory on them can be introduced into such infected supplies and therein multiply at the expense of the pathogenic micro-organisms, we are here clearly on the threshold of an entirely new and most interesting line of prophylaxis.

With regard to *amœbic abscess of the liver* Capt. S. N. Hayes, F.R.C.S., continues the discussion as to whether to aspirate or not in addition to emetine therapy. He concludes that multiple abscesses are probably commoner than single (in which view he is almost certainly right, as many recent papers have shown); that where the swelling is less than two finger-breadths below the costal margin emetine alone, without aspiration, will probably clear the case, but that where the degree of swelling is greater, aspiration is indicated. This is a rational view, and appears to us to correspond to the actual circumstances of the case. Thus we have recently treated several cases of mild enlargement without obvious symptoms of abscess formation with emetine alone, and they have done well. On the other hand a later case presented the picture of a greatly enlarged liver, with typical symptoms and cysts of *E. histolytica* in the stools. He had two full courses of emetine and responded favourably to each, but each time the fever and other symptoms recurred. Finally, he was put on to a third course of emetine and 15 ozs. of pus withdrawn by aspiration; since then he has made a sound recovery. In this instance at least it would appear that aspiration of the (harmless) pus was necessary to relieve pressure and other symptoms. Where secondary infection is present, open operation and drainage is obviously essential. A. K. Bhattacharya records a case of relapsing liver abscess, and those who were familiar with India in the pre-emetine days can remember many similar cases. The patient received an incomplete course of emetine injections in 1925, and relapsed a year later. The liver was enlarged to four finger-breadths below the costal margin, and very tender. Two courses of emetine were now given, but the patient's condition steadily deteriorated. Finally open drainage was instituted, and the patient made a sound recovery. The author speaks of the "failure" of emetine in such cases, but, so far from a failure of emetine, we believe that the emetine therapy contributed materially to the cure: at the same time it would seem necessary to admit that the larger amœbic abscesses of the liver require aspiration or drainage in addition to simple emetine administration.

Enteric Fever.—A paper read by Lieut.-Col. F. A. F. Barnardo before the Medical Section of the Asiatic Society of Bengal, and published in our issue for July, calls for review. The author states that it is not always easy to diagnose the enteric group of fevers, especially during the first week of illness. On the other hand it is very important to establish the true diagnosis during the first week, in order to take proper measures with regard to treatment and prophylaxis. True relapses are uncommon in typhoid fevers, but what are very common are supposed relapses due to secondary infections, such as the invasion of the blood-stream by streptococci through the typhoid ulcers, or the evolution of kala-azar in a patient previously debilitated by an attack of typhoid fever. Of all diagnostic procedures during the first week of illness none is more reliable than blood culture. Finally, the possibility of cases of pyrexia of uncertain origin being anomalous cases of the enteric group of fevers should always be borne in mind. The conjunction of a continuous fever—of however low a grade—persistent headache, constipation, and symptoms of bronchial irritation may be due to persistent influenza, but should always arouse the suspicion of the possibility of enteric fever. An interesting discussion followed the reading of this paper, during which emphasis was laid on epistaxis as an important diagnostic symptom in the early course of typhoid fever.

Sprue.—The special enquiry at the Haffkine Institute, Bombay, into the ætiology and pathogenesis of sprue under the Indian Research Fund Association was continued during the year. In this connection Lieut.-Col. F. P. Mackie reports as follows:

Research work on sprue, started by Col. Mackie and Dr. Hamilton Fairley in 1923 and interrupted from April 1925 to November 1926, has been carried on at the Haffkine Institute, Bombay, throughout the year.

Col. Mackie and Dr. Chitre have made an exhaustive study of the relationship of yeasts (*Monilia*) to sprue. For the isolation and study of cultural characters of yeasts they have used a glucose peptone water acidified with tartaric acid, Sabouraud's medium, Raulin's medium and gelatin stabs. Their study of the structure and life-history of intestinal yeasts leads them to the view that the human intestinal yeasts have been over-differentiated. Relying on the morphological and cultural characters, which they describe in detail, and the power or failure of ferment maltose, they divide the human intestinal yeasts into two main classes, A and K. Class "A" consists of yeasts that ferment maltose; this property is constant and unaffected by prolonged subculture. This class includes yeasts isolated by various observers from the alimentary tract of sprue cases and are regarded by some as pathogenic. They conform in almost all respects to *M. psilosis* (Ashford). Class "K" are maltose non-fermenters. This class includes the "wild yeasts" and are similar if not identical with *M. kruzei* (Castellani).

In their study they isolated *M. psilosis* in 29 out of 71 cases of sprue (40 per cent.), in 10 out of 27 cases of intestinal disease not sprue (37 per cent.), in 14 out of 36 cases of other diseases (38 per cent.) and from about 50 per cent. of the intestinal tracts of healthy men and animals examined. *M. kruzei* was present in about 50 per cent. of sprue and other human diseases and in a similar proportion of healthy men and animals. They came to the conclusion that "the distribution of these classes of yeasts was similar in sprue to that in other diseases, and there was no undue frequency of any type of yeast in any diseased or healthy condition, and therefore there is no evidence to show that any of these moniliæ bear a causative relation to sprue.

These workers have amplified their clinical observations by animal experiments. They employed guinea-pigs, rabbits and monkeys as experimental animals, and gave *M. psilosis* cultures by intraperitoneal injection, intravenous inoculation and *per os*. They also infected some monkeys by feeding them on the fæces of sprue patients. The monkeys so infected had been previously devitalised by being fed for several weeks on a diet deficient in vitamin C. In none of the animals however inoculated and whether in a condition of vitamin C deficiency or otherwise, was there any development of an intestinal condition resembling sprue, nor was any condition of anæmia produced in the animals which were especially examined for the condition; though *M. psilosis* is undoubtedly toxic for some animals especially by the intravenous route.

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Col. Mackie and Dr. Gore have investigated the bacteriology of the alimentary tract in sprue. So far they have found no bacillus peculiar to sprue. The commonest organism of pathogenic significance met in the condition is a "Morgan-like" bacillus. A vibrio-like organism has been recovered from the duodenal contents and the blood of three cases but its significance is not yet clear. Hæmolytic bacteria were commonly found in sprue stools, a fact which may throw some light on the anæmia.

Col. Mackie and Dr. Billimoria have examined the blood of 28 cases of sprue during the year. The results correspond closely with the results of a series of 25 cases reported before by Fairley and Mackie. They come to the conclusion that "profound anæmia where the red cells are below a million is rare in sprue, but is met with in terminal stages—sometimes as a result of a blood crisis where the count may fall by two million per c.mm. within a week. Severe anæmia counts between 1 and 2 millions are frequent in the later stages of the disease. Moderate anæmia is present in practically all cases of early and fully developed sprue." They find the blood picture to be constant and readily distinguishable from that of pernicious anæmia. Its characteristics are a marked anisocytosis, the megalocytes preponderate, the poikilocytes are few, and polychromatophilia is present but generally scarce, and a total absence of nucleated red cells. The average colour index was 1.1, with fully half the cases below 1. They sum up the blood condition as follows:—"A megalocytic anæmia without signs of regeneration, i.e., an aplastic anæmia."

The senior author has made post-mortem examinations of ten cases of sprue. He saw little naked eye change in the organs, except perhaps thinning of the gut wall and reduction in the size of the liver. But he is inclined to regard this a part of a general process of emaciation. He found no evidence of inflammation or ulceration in any part of the intestinal tube. He however found the condition of the bone-marrow to be characteristic. The marrow of long bones, like the tibia, in all cases was in a condition of more or less complete aplasia. This condition is in keeping with the state of the blood picture. All the material obtained at these examinations has not been fully worked up yet.

Major Sokhey, Mr. Gokhale and others have studied the liver function in sprue. They employed the levulose tolerance test, the Van den Bergh reaction, the brom-sulphalein test of Rosenthal and White and determined the nitrogen partition of blood in 13 cases of sprue and came to the conclusion that liver function was not impaired.

Major Sokhey and Mr. Malandkar have also studied the pancreatic function in sprue. Employing Saxon's wet method of fat analysis of fæces, they found that all but one of their series of seventeen cases showed normal splitting of fat. Quantitative estimation of diastase, trypsin and lipase of duodenal contents, showed these ferments to be present in normal amounts. The conclusion they arrive at is that the pancreas, as far as its external secretion is concerned, functions normally in sprue.

A still further publication with regard to sprue is one by Dr. Hamilton Fairley in the *Medical Journal of Australia* with regard to the differential diagnosis of pernicious anæmia and sprue. This is reviewed by Dr. Manson-Bahr in the *Tropical Diseases' Bulletin* as follows:—

"Referring to the differential diagnosis between pernicious anæmia and sprue, Fairley finds a colour index above 1 in 56 per cent. of sprue patients. Difficulty in differentiation was only experienced when the alimentary features were atypical. In this group the most reliable clinical features were emaciation or a history of marked loss of weight, the passage of bulky stools, abdominal distension and the complete absence of any neurological signs suggestive of subacute combined degeneration of the cord. Even in latent sprue there is definite limitation on the part of the intestinal mucosa to absorb fat; this becomes obvious directly the fat content of the diet is increased. In 36 consecutive cases throughout all periods of the disease, during and after treatment, it was shown that the fat averaged 49.1 per cent. of the dried fæces. Of this 7 per cent. represented neutral fat, 17.3 per cent. fatty acid, and 22.8 per cent. was in the form of combined fats. Defective fat absorption is not a feature of pernicious anæmia. The blood in sprue may show the characteristics of an aplastic pernicious anæmia and the bone-marrow the corresponding changes. In the long bones gelatinous, greenish marrow deficient in erythroblastic elements is observed. On the other hand, evidence of intravascular hæmolysis is limited in sprue; the deposition of hæmosiderin in the liver and kidney is also not marked, whilst out of 16, nine cases gave Van den Bergh readings of under 0.5 units and seven exceeded this figure.

The fractional test meal affords most important data from the standpoint of differential diagnosis. In pernicious anæmia the achlorhydria is a true *achylia gastrica*, due to a secretory defect. Analysis of total and free acid curves in a consecutive series of 26 cases of sprue demonstrated that four were hyperchlorhydric, seven normal, and eight hypochlorhydric. In the achlorhydria of sprue, hydrochloric acid is being secreted efficiently, and its absence from the gastric content is dependent on neutralization by alkaline fluids derived from the duodenum. Experience in Bombay was convincing that sprue and pernicious anæmia are distinct clinical entities."

KALA-AZAR.

Epidemiology.—Major H. E. Shortt reported a case of kala-azar in a man who had only paid two short visits to endemic areas in the plains; one visit was 9 months and the other 3 weeks before the onset of symptoms. It is presumed that he acquired the infection during the first visit.

Major P. Savage reported a case of kala-azar in a boy at Sanawar in the Simla Hills; the boy did not appear ever to have been in a known endemic area. A second patient who was also apparently a case of kala-azar had not been away from Sanawar for many years. In this connection Major Sinton pointed out that *Phlebotomus argentipes* had been discovered in Sanawar.

T. K. Raman gave details of 406 cases of kala-azar admitted to the Madras General Hospital during 1924 and 1925. He reported that sandflies in Madras were plentiful during July, August and September and again in April, but rare during the cold weather months and hot dry months.

Transmission.—No definite advance has been made during the year in the kala-azar transmission problem although a number of papers which fill in the gaps in our knowledge on various subjects and which may have some bearing on this problem have been contributed.

Members of the Kala-azar Commission in Assam, Major H. E. Shortt, J. P. Barraud and Captain A. C. Craighead, have reported the successful infection of a white mouse inoculated intraperitoneally with the intestinal contents of *Phlebotomus argentipes* infected with *Leishmania donovani* The same authors describe comprehensive transmission experiments with *Phlebotomus argentipes* and *Leishmania donovani* which they summarise in the words, "Sixty experimental animals subjected to 184 bites from a minimum of 152 sandflies, *Phlebotomus argentipes* known to be infected with *Leishmania donovani* have in no instance developed kala-azar. H. E. Shortt, A. C. Craighead, Khazan Chand and C. S. Swaminath have given an account of the non-flagellate forms of *Leishmania donovani* found in old cultures in their relationship to the production of infection in animals and have come to the conclusion that the presence of these bodies in cultures is not necessary to the production of infections. The first and last writers mentioned above have also given in another publication a full description of the mode of formation and morphology of these bodies.

L. E. Napier in a short series of observations on the infectivity of the flagellate form of *Leishmania donovani* showed that five-day-old cultures would give rise to infection in mice, he further tentatively concluded that early cultures in which the flagellates are scanty give

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rise to infection less readily than do older, richer cultures, but that after 12 days or so, there is little increase in the infectivity of the culture, and that the individual flagellates become less infective at some age between 12 and 28 days.

L. E. Napier and R. O. A. Smith reported the development of *Leishmania donovani* in the sandfly *Phlebotomus papatasii;* 2 per cent. of specimens fed on kala-azar patients were infected, whereas 42 per cent. of specimens of *Phlebotomus argentipes* fed under similar circumstances became infected.

Clinical.—B. N. Bhadari reported a case of opacities in the lens occurring as sequel to kala-azar. R. P. Chatterjee reported a case of arrhythmia of the heart after injections of urea-stibamine; the pulse dropped to 36. The arrhythmia disappeared on the administration of atropin, but reappeared when another urea-stibamine injection was given.

Diagnosis.—Lieut.-Col. E. C. Hodgson, A. C. Vardon and Zorawar Singh have described a blood sedimentation test for the differentiation of malaria from kala-azar and other fevers. H. E. Shortt, S. Das, and Chiranji Lal have given an account of the finding of parasites of kala-azar in the peripheral blood. By the technique described even a short search for the parasite yielded a high percentage of successes, 78.7 per cent. The factors associated with the presence of the parasites in the peripheral blood are discussed.

Major R. N. Chopra, J. C. Gupta and J. C. David made the observation that the addition of 4 per cent. solution of Stiburea (Urea-stibamine) and certain other pentavalent compounds of antimony when added to the serum of a kala-azar patient caused coagulation of the serum and that when this solution is added to a normal blood no coagulation occurs. They suggested that this phenomenon might be adopted as a diagnostic test in kala-azar. The two senior writers together with N. K. Basu extended these observations; they found that the percentage of positive tests was higher than with the aldehyde test; five cases of early kala-azar, in which the diagnosis was subsequently confirmed by blood culture, gave positive reactions with antimony but negative with formalin. In certain diseases, other than kala-azar, in which there is enlargement of the spleen a positive antimony test occurs but in these cases the reaction is not strongly positive. They suggested an even simpler test by which two drops of blood from a finger are received into 2 per cent. potassium oxalate and 4 per cent. solution of antimony added. They say that by this test they obtained results parallel to the antimony-serum test.

In a later communication these three writers point out that there has been a certain amount of misunderstanding about the reading of the antimony test. For the test to be considered positive a thick flocculent plug should form at the junction of the antimony solution and serum; this plug is not easily broken up and does not dissolve when the test tube is left standing for 24 hours. They also point out that certain samples of urea-stibamine appear to give positive results with normal serum so that whenever possible a control of normal serum should be put up at the same time. Further they have observed that by diluting the serum 8 or 10 times it is possible to exclude certain cases of enlarged spleen, non-leishmanial, in which there was a positive reaction with the strong serum; when diluted in this way these sera give a negative reaction. The test was performed in 30 cases of dermal leishmaniasis; it was negative in all but one case.

Following on Chopra's original observation of the precipitation of kala-azar serum by the addition of antimony solutions, L. E. Napier independently worked out a technique for the application of this phenomenon as a test for kala-azar. In view of the fact that 4 per cent. solution of the antimony compounds appeared to give positive results in many cases of enlarged spleen which were not cases of kala-azar, he suggested using a more dilute solution of Stiburea. In a paper on the subject he drew the following conclusions:—

"The above-described reaction occurs with a number of pentavalent antimony compounds and the intensity of the reaction appears to vary according to the therapeutic efficiency of the compound used.

The diagnostic value of this test appears to be equal to that of the aldehyde test, but further experience is necessary.

It has two distinct advantages over the aldehyde test, namely, that only a small quantity of serum is required, and that a clear-cut result can be obtained when the serum is milky, as is often the case with children's serum.

The test is best performed by adding 2 drops of a 24-hour-old serum to 2 c.c. of a 0.25 per cent. solution of Stiburea, or 2 drops of freshly separated serum to 2 c.c. of a 1 per cent. solution of Stiburea, agitating, and leaving on the laboratory bench for 10 minutes. If the serum is from a patient suffering from kala-azar a heavy flocculent precipitate will form which will separate within 10 minutes, leaving a clear supernatant fluid."

A. N. Sen reported the results of the antimony test in 42 patients under his charge of which 20 cases of kala-azar; he considers the test of considerable value.

Pathology.—C. C. Basu described a method of staining Leishmania in the tissues by using Gorriz's modification of Bielschowsky-Cajal's silver staining method. The stain does not fade. C. Ray made some further investigations into the albumens and globulins of kala-azar and syphilitic bloods.

Prophylaxis.—L. E. Napier and P. Foster in a paper on the control of kala-azar on tea estates concluded that by segregation and treatment alone the spread of kala-azar on a tea estate cannot be stopped, but by this means it can be controlled; that a lesser degree of success can be expected from treatment alone; and that transfer of the lines can be expected completely to cut short an epidemic. Whether it is advisable to advocate the transfer of lines in view of other considerations is an entirely different matter. It is seldom possible to carry out a complete transfer in less than a year; by this delay the value of the measure is considerably reduced. Furthermore it is very unpopular with the coolies and is expensive. On the other hand the treatment of the disease is very satisfactory these days and a cure rate of at least 95 per cent. can be anticipated. Special circumstances must dictate the line of action to be taken.

Treatment.—L. E. Napier contributed a paper on the treatment of 61 patients by No. 693, a pentavalent compound of antimony. In this series there were no deaths and, except that two patients proved entirely resistant to this as well as all other forms of antimony treatment, no relapses. The writer was able to get into touch with 50 of the patients all of whom had remained in good health for periods of at least six months after discharge. A number of the patients were cured after 8 injections and it was calculated that a course of 10 injections should produce a cure rate of *at least* 93.3 per cent. The same writer pointed out in a letter to the *Indian Medical Gazette* the value of Aminostiburea, more especially in the treatment of resistant cases. L. E. Napier and K. C. Haldar in a paper on the cure rate in kala-azar point out that very large number of patients who receive a course of treatment which is usually considered totally inadequate are actually cured; the cure rate was about 40 per cent. amongst those receiving less than 1 gramme of sodium antimony tartrate, but 87 per cent. amongst those receiving more than 2 grammes of this salt. C. C. Sanyal reports good results from the rectal administration of Stiburea in kala-azar.

Dermal leishmaniasis.—Lieut.-Col. H. W. Acton and L. Everard Napier gave a detailed account of post-kala-azar dermal leishmaniasis. Their observations were based on 44 cases of this condition. They describe the three stages of the disease and the pathological findings associated with these stages. The paper is profusely illustrated.

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B. M. Das Gupta discussing this condition from a laboratory point of view says that it is seldom possible to find the organisms in a smear from the depigmented lesions, but that on several occasions he has grown flagellates from a piece from a depigmented patch. On one occasion he obtained a flagellate culture from the peripheral blood of a patient who had typical dermal lesions; the patient had no enlargement of the spleen but for some time she had had fever which was not amenable to quinine. In another communication he reports an experiment which, he considers, proves that organism found in the dermal lesions is *Leishmania donovani* and not *Leishmania tropica*. He inoculated the contents of a 12-day-old culture, obtained from a dermal leishmaniasis nodule, into the peritoneal cavity of a mouse; a visceral infection followed.

U. N. Brahmachari and A. M. Dutt reported a case of dermal leishmaniasis in which parasites were present in the peripheral blood and the patient had symptoms of kala-azar.

Oriental Sore.—Dr. Ganapati Panja reports infecting a patient by means of a 1-week-old culture of *Leishmania tropica*. He inoculated 1 c.cm. of the culture; three weeks later a nodule appeared which eventually, one year after the inoculation, broke down and formed an ulcer. Leishmania were found in the ulcer. (The writer's claim that this is the first occasion on which this experiment has been successfully performed is not valid.)

F. de Mello and V. Camotini report a case of oriental sore in which the infection was apparently contracted at Goa.

Owen reports a case of oriental sore in Bagdad in which there were 250 lesions.

Treatment.—R. L. Varma advocates berberine sulphate in the treatment of oriental sore; he claims to have had good results after local injection.

Captain P. V. Karamchandani gives a very brief analysis of the treatment of 337 cases of oriental sore. Of these 300 were treated by sodium antimony tartrate injections. Of the other methods employed he considers berberine sulphate the most promising.

Canine leishmaniasis.—C. R. Chadwick and C. McHattie give a very detailed account of the cutaneous lesions occurring in dogs in Iraq. In Bagdad the disease is confined almost entirely to the cold weather months.

Publications.—During the year L. Everard Napier published a book on Kala-azar. The book was designed to replace the book written by himself and Dr. Muir about four years ago. It has been almost entirely re-written and all the latest advances in our knowledge of the disease, especially of its ætiology and treatment, are embodied in this new publication.

TROPICAL FEVERS, TYPHUS, DENGUE, WEIL'S DISEASE.

The subject of *tropical typhus* continues to attract attention. Lieut.-Col. L. H. L. Mackenzie draws attention to cases suggestive of this disease in the Gilgit Agency; louse transmission could be excluded, and it was never epidemic. Two further cases at Kumaon are described in our issue for May; one in a European schoolgirl from Naini Tal; the other in a European male, aged 64, who died in a state of coma on the 13th day of illness. There was no history of tick bite in either case, but the patients were free from lice. Dr. R. N. Bannerji describes a further case, a Mahommedan pleader in Allahabad; the rash came out on the 6th day, there was coma and glycosuria, and the fever finally fell by rapid lysis. No ticks or lice were found on the patient.

From the United Provinces we have received the following special report on this disease by Capt. D. Clyde, Assistant Director of Public Health (Malariology), U. P.

From an investigation into tick typhus at Bhim Tal in July and August 1927, it would appear that reliance cannot be placed on the past statistics dealing with the incidence, etc., of the disease as recorded in the local hospital since.

(*a*) True typhus and tick typhus were not recorded separately.

(*b*) Several cases diagnosed as probable typhus were certainly neither typhus nor tick typhus.

(*c*) A clinical diagnosis only is made in almost all hospital cases, blood examinations are very seldom made. The routine treatment given is small doses of quinine (7 grains twice daily) to all classes of fever.

(*d*) Subsequent histories are seldom followed up and cases seldom visited in outlying villages. The evidence on which a case mortality of 5 per cent. is locally based would appear erroneous, as true typhus, enteric fever and malaria are not eliminated by a differential diagnosis.

(*e*) Reports from friends coming in from outlying villages are relied upon; these are extremely erroneous. It is noteworthy that in some cases a "rash" on which a probable diagnosis of tick typhus had been based, turned out to be sudamina.

Of 43 cases of illness among villagers examined 38 were malaria (9 M. T.; 1 B. T.; 2 mixed M. T. and B. T.; 26 old clinical malaria), 1 was pleurisy and 4 gave a history corresponding to the tick typhus group of diseases.

These cases were four motherless children of a cultivator in village Sanguri which is about 1,000 feet above the lake in Bhim Tal. The ages were 4, 6, 6 and 10 years respectively. The youngest child contracted the disease on the 1st of June, the second child on the 9th of June, the third child on the 16th of June and the eldest child on the 18th of July, 1927. These cases were seen on 17th July, 1927. No history of tick bites was forthcoming. The ticks found in the vicinity were *Hæmaphysalis* only (on dogs and goats). The local anophelines were *A. listoni, fuliginosus*, a few *maculipalpis* and a few *willmori* at the date of investigation.

There would appear to have been little possibility of the vector or reservoir of infection being associated with the lake region in these cases.

The onset in all four cases commenced with malaise and frontal headache; 24 hours later fever commenced. The fever in all cases appeared to be high and of sudden onset. There was no rigor in any case. The fever remained high for 10 to 12 days during which the patients were prostrated. On the 10th or 12th day the temperature dropped and a rash appeared. Slight temperature continued till the 18th or 19th day. The rash and fever disappeared together on the 18th or 19th day.

The rash appeared first on the 10th or 12th day of fever on the supra-clavicular region and had spread within 24 hours to the front of the chest and the upper part of the abdomen. The face, legs, back and lower abdomen were free from the rash in all cases. The rash was apparently macular, discrete and whitish, the individual spots were about the size of a pin's head. It faded in the order of occurrence from the supra-clavicular region downwards. In all cases the rash lasted from 6 to 9 days and was followed by desquamation. The last case to become infected showed branny scales on the front and back of the chest and discolouration of the skin over the same area on 17th July, 1927. Convalescence was extremely rapid in all cases.

It was only possible to examine the blood of the eldest child.

(1) Differential count:—

Eosinophiles	1%
Polymorphonuclears	61%
Small mononuclears	32%
Large mononuclears	6%

Arneth's count within normal variation.

(2) No malarial parasites. No abnormality in size, staining, etc., of red cells.

(3) Agglutination against:—

(*a*) *B. typhosus*—positive in 1 : 8, negative in higher dilutions.

(*b*) Para A and B—negative in all dilutions.

(*c*) *M. melitensis*—negative in all dilutions.

(*d*) *Proteus* X19—negative in all dilutions.

(Fletcher's strain of X19 was not available.)

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No new cases of continued fever with rash were found between 16th June and 1st October, 1926.

Dengue.—Major G. H. Dive, R.A.M.C., gives an account of dengue in Aden, where he states that this disease is endemic. Troops arriving in the winter months are most commonly attacked between April and July, whilst there is a second infective season about September. A considerable degree of immunity is afforded by one attack. Both infective periods correspond with the optimum season for mosquito development, and it is very doubtful whether true sandfly fever ever occurs in Aden. Various other diseases, such as influenza and rubella, have previously been confused with dengue in the returns from Aden.

Weil's Disease.—As noted in Knowles' *Introduction to Medical Protozoology* (published during the year) slides kindly sent by the observers in the Andamans and fixed material from the cases of epidemic jaundice in the Andamans show undoubted leptospira, and the epidemic jaundice of the Andamans must now be considered to be Weil's disease. Dr. D. L. Galloway describes five cases in Malaya, and the *Malayan Medical Journal* a further series of four cases. Leptospira were found in experimentally infected guinea-pigs; one of the convalescent patients—a Japanese—travelled to Japan, where six weeks later his daughter contracted the infection, and the original patient's urine still showed leptospira. It is clear that Weil's disease extends in sporadic form throughout the Andamans and the Malay archipelago, and it will probably be found to occur in Burma and Bengal.

A. Paes discusses a curious epidemic disease which has within recent years affected the child population of Nova Goa. In the benign type the condition begins with fever and vomiting; in severe cases there is uncontrollable vomiting, acute constipation, and great tympanites; in fulminant cases there is complete unconsciousness and the child dies within a few hours. The meningococcus was found in some cases, but the symptoms are quite unlike those of cerebro-spinal fever; so far from there being rigidity, there is complete muscular relaxation; and the administration of anti-meningococcus serum did not improve results. The case mortality is about 30 per cent., and the best line of treatment is a brisk purgative at the onset of the disease. The symptoms are those of an overwhelming toxæmia, but it is remarkable how rapid and complete is the recovery in the non-fatal cases.

K. C. Ghose records the results of treatment of *lobar pneumonia* by daily intravenous injections of iodine; every alternate case was treated and the others left as controls. On a series of 20 cases treated and 20 controls he considers that the iodine treatment does not affect the progress of the disease, but there appears to be much less toxæmia in the cases so treated. The injections should be given very slowly.

Major H. Hingston writes on *ketosis* in acute fevers, dealing chiefly with fevers of the enteric group. The examination of the urine for acetone and diacetic acid is of extreme importance and forms an important basis for treatment. None of the pathological investigations are infallible, though early blood culture is probably the best. If acetone or diacetic acid is found the patient is put on to an alkaline mixture, potassium citrate, dr. ii, liquor ammoniæ acetatis dr. ii, sodii bicarbonatis gr. xxx, spir. ammon. aromat. m xxx, and water to the oz.; one dose every four hours or so until the urine is acetone-free. Two drachms of glucose are also given every two or four hours. The value of the method is shown in a table of 20 cases, of whom only two proved fatal—one from subsequent otitis media. The same line of treatment is also valuable in pneumonia.

LEPROSY.

"Widespread activities in dealing with leprosy in India have centred round the Indian Council and the Provincial Branches of the British Empire Leprosy Relief Association," writes Dr. E. Muir. "The work of this organisation, founded in 1925, is developing satisfactorily. Research work has been given a prominent place, and training of doctors in leprosy work at various centres and at the Calcutta School of Tropical Medicine has been taken full advantage of. A survey under the experienced leadership of Dr. Isaac Santra has been begun with the object of locating the most highly endemic areas and the most affected classes of people, and studying the causes which make for this excessive endemicity. Sample surveys have already been conducted in Bihar and Bengal with interesting and important results. Large numbers of special leprosy clinics have been begun both in towns and rural areas, and the popularity of these clinics is best evidenced by the fact that in two of them between 400 and 500 patients attend every week. What is perhaps even more important is the interest which private practitioners are taking in the treatment of the disease, and the hopelessness and fear of contagion which formerly prevented doctors from attending leprous patients is giving way to a more reasonable attitude. Literature, posters, and lantern slides have been prepared and are available from the Secretary to the Association. Leprosy is perhaps the only disease against which there is a central organisation with influential branches in every Province, and if the disease was more or less at a standstill, neither increasing nor diminishing when practically no effective steps were being taken to stamp it out—as was the case a few years ago—, surely it is not too sanguine to expect a considerable diminution of its frequency now that so much effort is being put forth and so much intelligent interest taken. Other countries are taking an interest in what India is doing, and doctors from the Philippines, Egypt, Greece, the Gold Coast, and Nigeria have been sent to India to study the methods adopted here."

Epidemiology.—Dr. E. Muir deals with the factors influencing the endemicity of leprosy. The chief direct causes of high endemicity are dietetic, the poor diet available being supplemented in some areas by decomposing fish, meat, rice, etc. Caste and race have a certain bearing due to habits regarding diet, and to certain aboriginal tribes being driven into the less fertile tracts or into serfdom or debt. Venereal diseases, which predispose to leprosy are especially common among certain low castes. The poor soil of certain tracts, its porosity and the slope of the land are of importance, as the crops are correspondingly poor or precarious and dietetic errors result. While a very low humidity makes for a low incidence of leprosy, as shown by Sir Leonard Rogers, there seems to be no close correlation between humidity and leprosy. Excessive rainfall, by washing away and impoverishing the soil, by leading to mosquito breeding and malaria, and in other ways, may have an indirect effect.

In our issue for August Dr. Muir deals in more detail with leprosy in the Bengal-Bihar border line. Here, in the Sonthal Parganas the incidence of leprosy is notoriously high; in a school of 300 boys 11 were found infected, whilst even the unskilled census returns give an incidence of 20 per mille, and this figure is probably well under the mark. On the Chota Nagpur plateau the aboriginal lives in his natural freedom and security from infectious diseases, out of touch with civilization. On the fringe of this area he penetrates into a less healthy area where he has his first contact with civilization, and the reaction of contact makes or means all the factors that make for leprosy: clothes, crowding, poor food, venereal disease, etc. In this area the raw material in the form of aborigines coming from non-infected tracts becomes both leprolised and syphilised. Finally, beyond this is a broad fringe into which the constantly migrating infection gradually tails off, with areas of increased incidence in the larger cities from imported infection. If everyone in Calcutta suffering from leprosy were to be cured to-morrow there would be a still further influx of the infection the next day. Hence the necessity for incessant propaganda work, for leprosy clinics, for the training of *mofussil* medical men with regard to the diagnosis and treatment of early cases. Dr. Isaac Santra continues this article, giving a more detailed account of leprosy as it exists in the

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Manbhum District, and of the steps being taken to combat it. The incidence in the general population is here 6.49 per mille, and the low Bauri caste—usually the servants of Brahmins—are especially affected. The Sonthals, aborigines of a much higher general standard of cleanliness and living, are much less affected. There can be no hope for the Bauris until society elevates them to human conditions. The lines along which this problem is to be tackled are incessant propaganda, an attempt to introduce fresh milk and vegetables into the dietary of the people, the opening of special leprosy clinics, confidential registration of lepers, periodical examination of school children, and training of medical men.

Symptomatology and Diagnosis.—Major R. B. Lloyd, Dr. Muir, and Rai G. C. Mitra Bahadur deal with the influence of syphilis on leprosy as indicated by the Wassermann reaction. This is a final report summarising the results of several years of work. The percentage of positive reactions—in mild cases of leprosy 15 per cent.—is not higher than that in the general control population. These positive reactions are due to co-existing syphilis, and not to the leprosy. Further, this is true even in the more advanced cases of cutaneous leprosy, where the figure may rise to 50 per cent. of positive reactions. The obvious deduction is that syphilis is a factor which increases the severity of leprosy in the patient and leads to more severe leprotic symptoms and signs. Hence, in such cases treatment of the syphilitic infection may do very much towards improvement of the leprotic condition. In such cases Avenyl, "Hg. 33" (B. W. & Co.) has proved a most useful drug in treatment. It becomes necessary to provide anti-leprosy clinics with facilities for the carrying out of the easier serological tests for syphilis, of which the Kahn flocculation reaction is preferred. Anti-leprotic treatment has no effect upon the positive Wassermann reaction, but anti-syphilitic treatment not only results in a negative Wassermann reaction, but in very marked improvement in the leprotic condition.

The effect of coincident kala-azar in leprosy has also been studied by Dr. Muir during the year. Kala-azar has been endemic in recent years at the Albert Victor Leper Asylum, Gobra, Calcutta, and affected 16 of the lepers there. Of these 16 cases 3 died, and the other 13—after recovery from their kala-azar—showed a very remarkable improvement in their leprotic condition. Almost any prolonged febrile condition may favourably influence the course of leprosy. On the other hand, in 5 cases where early leprosy appeared during the latter part of a course of treatment of kala-azar the leprosy was apt to be progressive. Prolonged febrile diseases appear to favour the breaking down of lepra bacilli, this is followed by a general bodily reaction, the further breaking down of other lepra bacilli, and their more rapid elimination.

Dr. J. M. Henderson of the British Empire Leprosy Relief Association discusses the gland puncture findings in leprosy. The value of this method of diagnosis has been the subject of considerable discussion in the past. A total of 93 patients were "punctured"; 57 of whom had been under treatment for a variable period, 36 of them new untreated cases. The later the disease, the more constant was the finding of lepra bacilli in the smears of gland puncture juice. In a small proportion of early cases gland puncture may sometimes demonstrate the bacilli where the examination of films from skin lesions has had negative results, but taken in general the method does not appear to be of value in assistance in the diagnosis.

Treatment.—The largest number of papers published during the year deal with treatment. Pride of place must be given to the full discussion at the Section of Tropical Diseases and Parasitology of the Royal Society of Medicine at which a paper by Dr. Muir was read, and Sir Leonard Rogers, Dr. R. Cochrane, and other workers from India took part. The following abstract of this discussion is taken from our contemporary, the *Tropical Diseases' Bulletin*, and well summarises the present position with regard to the present-day treatment of leprosy.

This important joint discussion at the Royal Society of Medicine by the Sections of Tropical Diseases and Parasitology, Dermatology, and Therapeutics and Pharmacology was arranged at the request of the Dermatological Section, which opened it. J. M. H. MacLeod reviewed the subject for the dermatologists, and dated the modern treatment of leprosy from the first leprosy international congress at Berlin in 1897, when the old hereditary theory was abandoned in favour of the contagious one. In 1909 it was declared that while leprosy is not incurable we do not possess a certain cure. He next pointed out that:—"Since then great advances have taken place, chiefly through the researches of my colleague at the Tropical School, Sir Leonard Rogers, and his associate, Dr. Ernest Muir in Calcutta; Power, Dean and Macdonald in Hawaii: Denny and Brill, in the Philippines, and others." After pointing out the difficulties in estimating the value of treatment in leprosy, with illustrative cases, he discussed the general, local and specific treatment; and included under the last class metallic preparations, sera and vaccines and vegetable oils and their derivatives, especially chaulmoogra oil; and he mentioned the advance made when soluble salts and esters of the fatty acids suitable for injection were introduced, that of *Hydnocarpus wightiana* being now most used. During the past two years he had been using at the St. Giles' Homes for British Lepers certain of these preparations, such as chaulmoogra oil, hydnocarpus oil, E.C.C.O., sodium morrhuate, sodium gynocardate, etc., by subcutaneous and intramuscular injection, but not intravenously owing to the vein trouble that may ensue; as the result of this experience he thinks it advisable to keep an open mind with regard to the specific action of these remedies, for while some patients held their own and improved in their general health, others were unaffected or showed only temporary benefit, and in none could a cure in the scientific sense be claimed. It was doubtful how far the arrest in some cases was due to the natural course of the disease, and treatment on general hygienic principles may help to increase the resisting powers of the patients.

J. H. Sequeira related a case apparently greatly benefited by "protein shock," which he thinks may be the real cause of the beneficial results in a number of the so-called cures. G. Pernet spoke of his experience in the treatment of leprosy in collaboration with Radcliffe-Crocker and later especially with perchloride of mercury injections, which were disappointing. He thought chaulmoogra oil the best remedy, but did not mention having used the new soluble derivatives. G. C. Low spoke of his experience with Manson's cases and subsequently with disappointing results, including two cases treated by recent methods, but he thought protein shock might sometimes have a good effect.

The Dermatological Section speakers were followed by T. A. Henry for the Pharmacological Section, who discussed the chemical composition of the different vegetable oils used in the treatment of leprosy, first studied by Power. He pointed out that gorli seed oil from West Africa was the only oil containing pure chaulmoogric acid, without the usual admixture of hydnocarpic acid of the other varieties; but pure ethyl chaulmoograte made from gorli seed failed in trials in leprosy. These results, he said, are supported by early observations of L. Rogers showing that the salts of the higher melting point fractions, mainly chaulmoogric acid, were less effective in leprosy than the lower ones containing more hydnocarpic acid, for the latter will be liquid or nearly so at the body temperature. He next spoke of a Hg33, or myristoxy-mercuri-*m*-hydroxybenzaldehyde, made in his laboratory, and soluble hydnocarpus oil. E. Muir had used the mixture in Calcutta by injection in syphilitic lepers with very satisfactory results.

The Tropical Disease Section's contributions to the debate were opened with a paper written by E. Muir, in which he first emphasised that we have no specific cure for leprosy in the sense of quinine in malaria and

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antimony in kala-azar; yet "there is a line of treatment which will cause the permanent disappearance of all active signs of the disease in early cases, so that the patient is for all practical purposes *cured*, though, if a marked reduction in his general health occurs later there is always the possibility of a relapse." Leprosy is a more remediable disease than tuberculosis, and leprosy can almost always be diagnosed clinically long before the bacilli can be found in the lesions, when the prognosis is far more favourable than in the corresponding stage of tubercle. Muir's well known lines of treatment by dealing with complicating diseases, diet, exercises, the injection of hydnocarpus oil, and its derivatives, external applications and surgical measures, were next described; the necessity of a close acquaintance with the stages and phases of the disease to allow of successful treatment and correct estimations of the value of drugs was emphasised. The fallacies due to limited experience and to the subsidence of acute phases independent of treatment being attributed to drugs were pointed out. His present routine treatment is the intramuscular or subcutaneous injection of 4 c.c. gradually increased to 10 c.c. of hydnocarpus oil containing 4 per cent. of creosote; and when the full dose is reached without local or focal reactions, 1 per cent. sodium hydnocarpate in doses rising from 2 to 10 c.c. is given intravenously, the oil being returned to when a reaction is obtained or the veins become blocked; an alternation of the two methods is best. The drugs may be pushed safely to cause reactions in the first and third stages, but caution is necessary in the active second stage to avoid dangerously severe reactions with spread of the lesions. Considerable experience, such as is only obtainable in the endemic areas, is therefore essential to enable the best results to be obtained. For the severe pain of nerve cases intramuscular injection of 3 or 4 minims of 1 in 1,000 adrenalin chloride is of value, and greatly thickened nerves may be benefited by incision and freeing the nerve from the surrounding tissues. Repeated negative bacteriological examinations, and disappearance of all erythema from the macules, with absence of change in the anæsthesia for six months, are the criteria of the disappearance of all active signs; after which treatment may be stopped and the patient watched for two years. A table is given of 64 cases remaining free from all active signs for one to five years, 36 of whom have been well for three to five years; and it is stated that if all those treated could have been followed up the number would have been four or five times as large, indicating lasting results.

He concludes that in spite of the absence of a certain specific cure "by carrying out treatment along the lines indicated above we can hope for a permanent disappearance of all active signs in almost all patients in whom the disease is recognized early. While in the later stages, although much more prolonged treatment is necessary, very promising results are obtained and many have become entirely better and have remained so for periods of several years." It follows that the treatment of many early cases at clinics, as in Calcutta and many other places in India, "is cutting off to a large extent the bacillary reservoirs which would have served to infect the next generation..... I think we already have in our hands a line of treatment which will aid the rapid disappearance of leprosy from India and from the world, though delay is inevitable, due to the ignorance and backwardness of certain classes of the community."

Sixteen striking photos before and after treatment in different stages are given, which leave no possible doubt of its value in experienced hands.

The next paper by H. W. Wade and C. B. Lara, Chief Pathologist and Chief Physician to the Culion Leper Colony in the Philippines, was communicated and read by L. Rogers, and dealt with the results of the modern treatment in nearly 6,000 cases at Culion and nearly 3,000 at Manila, so is of the greatest importance. After defining a leper they record that the first favourable results of the Mercado mixture intramuscularly, reported by V. G. Heiser, were not altogether confirmed by later experience, as most of the 24 patients who became negative under it apparently relapsed, for only four treated cases were released in 1913 after being negative for two years; the treatment was decidedly heroic. After the introduction of the ethyl ester chaulmoogrates intramuscularly they have been used very extensively, advanced cases averaging 8 years in duration being treated at Culion, and earlier ones at the San Lazaro Hospital at Manila; the number discharged from the later on parole as negative averaged 50 a year during the last five years, and reached 150 in 1925; while 76 more were paroled in the last three years at the Small Cebu detention camp. Among the advanced Culion cases by the beginning of November 1926, 629 negative cases had been obtained, or about 10.5 per cent. of those treated, which all the releases to the end of 1926 will bring up to 800. Moreover, relapses have been few, and are becoming still less frequent with increased experience. From 1913 to 1921, 88 cases were discharged, and between 1922 and 1926, 634, but the former only after being negative for two years, so the figures are not quite comparable.

The authors conclude that the ethyl esters are certainly more effective than the Mercado mixture, and "the modern treatment methods are decidedly superior to the older ones, and seem to be particularly effective in early cases. Though they are admittedly much less effective in well-established advanced cases, the results obtained in the Philippine Islands during the last few years show that a not inconsiderable proportion of such cases (probably 15 to 20 per cent.) can be 'apparently cured' if treated intensively, under proper conditions. This is a noteworthy advance, however discouraging to anyone treating any particular small group of unselected cases. In view of the impressive total, which all 1926 releases will bring to 800 or more, one cannot, we submit, deny the relative effectiveness of present treatment, or its absolute value in properly selected cases. It were quite as correct to deny the value of surgery in cancer. In leprosy, as in cancer, emphasis must be laid on getting the patient early. It is from this point of view that treatment is now revolutionizing anti-leprosy campaign systems."

Isabel Kerr contributed the third paper of the Tropical Diseases Section on the results obtained at the model Dichpali Institution, India; she recorded 17 and 19 per cent. respectively of cases becoming quite negative after treatment in two series of cases each spread over two years, no case that could possibly benefit being refused treatment, and she concluded that "most cases of early leprosy do well, and one can count on a large percentage of successes." She also agrees with Muir that third stage cases improve rapidly, and that with protracted careful treatment second stage cases also improve, 45 to 47 per cent. having been "very much improved" in addition to the recoveries; no less than 63 per cent. of the bacteriologically positive infective cases became non-infective under the treatment. This must result in greatly fewer new cases in the near future.

Robert Cochrane, as the result of a prolonged tour in the East, studying over 10,000 cases, was in agreement with the statements of E. Muir, for of the various treatments he had seen, Muir's creosoted hydnocarpus oil was both the cheapest and most effective remedy. Of 20 cases the speaker had discharged as recovered, none had relapsed eighteen months after the discharge of the last, and all were working as ordinary folk. E. A. O. Travers advocated once more the Chinese treatment with powdered *Hydnocarpus anthelmintica* nut, given orally with a small portion of cannabis indica; by which simple means he had obtained 11.5 per cent. of negative cases at the Kuala Lumpur leprosy institution in the Federated Malay States. The daily doses could be given out to 350 lepers in half an hour. Hasson in a few words reiterated his opinion that his "vaccine was absolutely specific"; the only such claim made in the debate. F. Hall from his experience in charge of the Leper Asylum in Fiji considered that there was no specific treatment for leprosy, and that all treatments producing sensitization or reaction are harmful.

L. Rogers replied for the Tropical Diseases Section, and pointed out that MacLeod's cases, as reported in the tables he showed, were nearly all residual resistant

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advanced cases in which various treatments had previously been tried without effect; so they were the most unsuitable cases for trial, any want of success being thus explained. The case recently reported by Graham Little as cured by Hasson's vaccine was a temporary exacerbation in a partially immune third stage one, which Muir has shown clears up by itself; so it affords no evidence of the value of the treatment; while Muir had just written to say that he had tried the vaccine sent him by Hasson in a favourable case with complete failure. Rogers then summarized the results recorded in the papers submitted in the Tropical Diseases Section papers, and some other recent trials, in the following table, and he pointed out that the data brought out the facts that in advanced cases only 10 to 20 per cent. became bacteriologically negative. In earlier ones treated at the Kalihi hospital at Honolulu, and at the clinics of Muir and himself at Calcutta for six months or more, 30 to 40 per cent. were apparently cured; the highest rate being 41 per cent. in the only series treated by the soluble sodium salts of the chaulmoogra series of fatty acids intravenously by the speaker. This method had been little used since his early work, on account of the blocking of the veins it often induced; but G. A. Perkins, the Culion expert chemist, had recently stated that it is the most active method, by which effective treatment was first obtained in a large group of cases; the gradual obstruction of the veins appeared to be the main reason against its extensive use at the present time. The speaker was glad to be able to announce that this difficulty had at last been overcome, as an unirritating hydnocarpate of soda had been prepared for him by T. A. Henry, which was painless on subcutaneous and intramuscular injection in the usual 3 per cent. solution, and also nearly unirritating to the veins in a 1 per cent. solution, but quite effective by all three methods; much more so than the ethyl esters in his limited recent experience, while Muir had now adopted it as part of his routine treatment. It had a further great advantage of rapid absorption, and, still more important in the tropics, its cost per dose worked out at about one-twentieth of that of a good ethyl ester. Large amounts had been sent out for trial, and if his experience was confirmed an important practical advance would result.

Since this discussion Muir has written to the reviewer to say that all vein trouble can be avoided, even with a 2 per cent. sodium hydnocarpate solution, by the simple expedient of drawing up about as much blood as the dose, rotating the syringe on its long axis to mix, and injecting the whole; up to 7 c.c. having been given thus with only slight temporary giddiness.

In our issue for April, Dr. Muir deals in general further with the present position with regard to the treatment of leprosy. In a further paper he deals with the difficulties experienced in treatment by blockage of the veins during the treatment of the disease by intravenous injections of hydnocarpus oil, due to endophlebitis. On the whole, intravenous administration of the sodium salts of a special fraction of hydnocarpus oil is followed by less blockage of the veins than is injection of the whole oil. A method is described in which the syringe containing the dose of oil is introduced into the vein, blood aspirated and mixed with the oil, and the combined dose then re-injected. Alternate injection intravenously of sodium hydnocarpus with subcutaneous infiltration with hydnocarpus oil with creosote is advised for general routine treatment.

The same author outlines his suggested treatment of leprosy by the oral administration of huge doses of potassium iodide. Commencing with very small doses, e.g., 1 gr. daily, the dosage is rapidly pushed until the patient is taking up to a daily dose of 240 grs. twice weekly. This leads to marked reactions in the lepromata, swelling and erythema of existing lesions, the appearance of fresh rose-coloured nodules, marked acceleration of the blood sedimentation test, and apparent granulation of the lepra bacilli in the lesions. The ability of the patient to withstand heroic doses of potassium iodide is very remarkable, for the treatment is very free from symptoms of iodism, and in general what is aimed at is a reactionary phase which will help to clear the leprous condition. Further, in suspected cases the

TABLE OF CASES TREATED WITH INJECTIONS OF CHAULMOOGRA OIL DERIVATIVES.

Place and Observer.	Years.	Cases.	Apparently cured.	Per cent. cured.	Much improved per cent.	Improved per cent.	Not improved.	REMARKS.
Manila .. .. (H. W. WADE)	1921-5	(2,990)	356	..	..	..	..	(1,511 sent to Culion.) Average duration, 2·65 years.
Culion .. .. (C. B. LARA)	1921-6	6,000	629[1]	10·5	..	..	..	(Average duration, 8 years.)
Honolulu ... .. (*U. S. Report*)	1920-4	394	124	31·47	..	..	..	Paroled, only 13 relapsed, of whom 7 had not continued treatment after parole.
Calcutta .. (E. MUIR)	..	203	43	21·18	..	..	..	Cases treated, 3 months or more.
		123	38	31·0	..	..	..	Cases treated, 6 months or more.
Dichpali .. .. (I. KERR)	1923-4	180	30	17·0	45·0	35·0	3·0	63 per cent. became uninfective.
	1925-6	?	..	19·0	..	..	..	Discharged, improved.
Japan .. .. (K. SHIGA)	1921-3	211	23	10·9	14·2	..	..	....
					21·7	48·6	29·6	Duration, 1 to 3 years.
Siam .. .. (O'BRIEN)	2 years	357	..	..	23·3	49·4	28·2	Duration, + 3 years.
New Caledonia .. (GENEVRAY)	..	70	6	8·75	31·4[2]	11·4	48·6	90 per cent. improved. After 18 months only 5 relapsed.
Korea .. .. (R. W. WILSON)	..	..	75	..	..	..	..	....
Calcutta .. .. (L. ROGERS)	1915-19	51	21	41·2	39·2	17·6	2·0	Sodium hydnocarpate intravenously.

[1] By end of 1926 the apparently cured would exceed 800.
[2] 17·14 classed as "nearly cured."

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flaring up of the lesions at the commencement of treatment may be of value in assisting diagnosis.

Rat Leprosy.—Along with his study of human leprosy Dr. Muir has been studying the natural leprosy of rats, together with Dr. Henderson and E. Landeman, and their preliminary results have been published during the year. There appears to be a close association between rat leprosy and human leprosy; the former disease is very readily transmissible from rat to rat; and the course of the disease in the rat is a relatively rapid one. After intra-abdominal inoculation of infective material tumour growths occur in the abdominal cavity and are of a granulomatous character, apparently consisting of marked proliferation of the peritoneal endothelial tissue with phagocytosis and multiplication of the bacilli. Fibrosis, caseation, and liquefaction occur in these tumours, and a study of this disease may throw some light upon the pathology of human leprosy.

Miscellanea.—Dr. Muir contributes the following further notes with regard to papers dealing with leprosy during the year 1927.

Efforts to improve the treatment of leprosy are being made in different quarters. Col. R. Row of Bombay continues to obtain improvement in patients by the use of autolysed tubercle bacilli referred to in last year's report, and a paper describing his method read by him before the Far Eastern Congress of Tropical Medicine.

Various other drugs have been advocated by other observers but in many cases the value of the remedy has been estimated by its effect on only one or two cases.

Potassium iodide has been used with remarkably good results in the Calcutta School of Tropical Medicine, both by itself and in combination with hydnocarpus injections, and this treatment has been adopted in several other centres throughout India from which equally satisfactory results are reported.

Iodide has also been found useful in making an early diagnosis in contacts and doubtful cases and in testing the freedom from disease in supposed "cures," in which it frequently shows up unsuspected foci. Some papers were read on this subject at the F. E. A. T. M. Congress and an article appeared in the October number of the *Indian Journal of Medical Research.*

A paper was read at the same Congress by Dr. Donaldson of the Chingleput Leper Settlement on the organisation of that institution, in which he dealt with the diet, treatment, method of keeping records, etc.

An article on the serology of leprosy was contributed by Major Labernadie, his results with the reactions of Metefy and Rubino being found useless in the diagnosis of the disease.

Another paper under the combined authorship of the last mentioned author and Col. Goyon described the frequency of leprosy in Pondicherry and the means adopted to remedy and prevent the disease.

Dr. J. M. Henderson also read a paper on "Some Hæmatological Aspects of the Potassium Iodide Treatment of Leprosy" describing in brief his work both on the hæmocytes and on the various fluid constituents of the blood.

An interesting contribution was given by Major Kirwan on the eye conditions met with in leprosy.

Dr. Raman Lampi mentioned the rapid increase from 1,115 lepers in 1911 to 2,055 in 1921 in the State of Travancore and suggested some probable reasons.

A paper by Muir, Landeman and Wardman described the use of potassium iodide in the diagnosis of the presence of leprosy in the children of leper parents at the children's home in connection with the Purulia Leper Asylum. A large proportion of the children in whom no definite signs of leprosy were discernible showed positive signs of the disease when large doses of iodine were given.

A paper by Muir discussed the value of the erythrocyte sedimentation test in regulating the use of iodides in leprosy, in diagnosis of early cases, and in determining the degree of elimination of the disease from the body.

A small booklet on the *Symptoms, Diagnosis and Treatment of Leprosy* has been contributed by Dr. Robert Cochrane, Medical Advisor to the Mission to Lepers, which abstracts much useful information and appends a useful map of India showing the various leper institutions in the country. Great praise is due to the Mission to Lepers for the splendid work they continue to do all over India in their many asylums and hospitals. In all the more important of these modern treatment has been adopted and first class European and Indian doctors have been appointed who are not only treating those afflicted with leprosy, but are training large numbers of doctors and compounders for this work. Indeed many of those employed in Government and District Board clinics have been trained in the institutions of the Mission.

A paper by Lloyd, Muir and Mitra on the relationship of syphilis and leprosy appeared in the *Indian Journal of Medical Research* for January, 1927. The conclusions arrived at are that a positive Wassermann reaction in leprosy is generally due to accompanying syphilis, but a certain number of false positives are found, the reaction however only being slight. The Kahn precipitation test is recommended as not giving false positives and as being specially suitable for the diagnosis of accompanying syphilis in outlying leprosy dispensaries and hospitals where the elaborate technique of the Wassermann is not available.

A paper by Muir on "The present position of treatment of Leprosy" appeared in the April number of the *Indian Medical Gazette*, abstracted from the *Proc. Roy. Soc. Med.*, shows that while we have as yet no specific for leprosy we have means at hand for dealing effectively with the disease.

PULMONARY TUBERCULOSIS.

Dr. C. Frimodt-Möller, Medical Superintendent of the well known Union Mission Tuberculosis Sanatorium at Madanapalle, S. India (whose first appearance as a regular contributor to this annual review we most cordially welcome), reviews the year as follows:—

Investigating the geographical distribution of some diseases in India, Lieut.-Col. J. W. D. Megaw and J. C. Gupta report that pulmonary tuberculosis is common in 176 districts, rare in 36, and unknown in none, and while undoubtedly very common all over India is specially prevalent in the larger centres of population.

B. N. Gupta and H. K. Dutt using von Pirquet's cuti-reaction in Calcutta find a positive reaction of 32 per cent. for men and 37 per cent. for women, but the total persons examined were only 1,330, far too few a number on which to base any scientific conclusion of tuberculosis incidence in a city with a population of 1¼ millions.

A. C. Ukil of Calcutta, at the Seventh Congress of the F. E. A. T. M. published his results of an investigation into the incidence of tuberculosis in Calcutta and Bengal. After many thousands of examinations he concludes that there is a low degree of bacillisation as well as a low morbidity and mortality from tuberculosis in infancy and childhood, in marked contrast to findings in Europe. This is very striking especially as Dr. M. Kesava Pai and Dr. C. A. Venugopal found in 1926 (*Tubercle*, August 1926) that by the end of the fifth year not less than 80 per cent. of the children were infected in Madras City. B. N. Gupta and H. K. Dutt, who found no positive reaction in 20 children under 5 years of age examined in Calcutta, suggest as an explanation that children, although perhaps more susceptible than adults, when once infected die very quickly and that only a careful investigation of the death-rate of children from tuberculosis will clear the doubts about the incidence of tuberculosis in children in India.

The value of artificial pneumothorax treatment becomes better known in India. Dr. P. T. Patel of Bombay, dealing with this subject, describes an improvised apparatus which is only one more demonstration that an expensive apparatus is not necessary. His remark that no case is too advanced for pneumothorax treatment if only it is one-sided, as long as there are not adhesions which will prevent the compression of the lung, needs guarding against. Experience elsewhere shows, for

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instance, that abdominal tuberculosis is a contra-indication, as is also laryngeal tuberculosis in many cases. Chronic fibroid disease is mentioned by Dr. Patel as a contra-indication of artificial pneumothorax treatment, but experience in the West, as also seen in Madanapalle, S. India, where this treatment has been used extensively for seven years, shows that it is in such cases that many of the most striking results are obtained.

Dr. M. Kesava Pai of the Tuberculosis Hospital, Madras, deals with the results of artificial pneumothorax treatment in 182 cases. According to his figures 41 per cent. of those patients in whom a good and partial pneumothorax was obtained were discharged as "arrested" and "much improved," that is considering only those patients who have a good prospect for after-life. This is a very good result and compares favourably with those of the West. As both Dr. Patel and Dr. Kesava Pai point out, the treatment is not without its dangers, but neither have had any serious accident, although in Europe there is a death-rate of about one to 1,000 or 1,500 operations.

One of the adjuncts which has recently been to the forefront in the treatment of tuberculosis is sanocrysin. Dr. E. Frimodt-Möller of the U. M. T. Sanatorium in Madanapalle describes (*Indian Medical Gazette*, July 1927) the results of treatment of 80 patients with sanocrysin during a period of two years. He concludes that in sanocrysin we have a drug which is proved to be of great value when properly used in selected cases, although it has its dangers; but these have been much lessened by the treatment now advocated with small doses and long intervals between doses. Dr. M. Kesava Pai, who has treated 43 cases with sanocrysin and 41 with krysolgan, says that sanocrysin is of greater value in the exudative cases, whilst krysolgan seems to have a better effect in the fibrosing cases. Krysolgan is, however, more toxic and produces more unpleasant effects even with small doses (abstract of papers, Seventh Congress, F. E. A. T. M.).

The possibilities of the use of B. C. G. vaccine (Calmette) in India have been dealt with by Dr. A. C. Ukil (Seventh Congress, F. E. A. T. M.), and he foresees a large applicability of this vaccine in the protective inoculation of the vast number of non-immunized people in India, selected by two negative cuti-reactions, whether infant or adult.

Dr. M. Kesava Pai and Dr. K. Venkata Rau, working with the complement-fixation test for tuberculosis, report (*Tubercle*, May 1927) that they have developed a technique by which they get 96 per cent. of positive reactions in clinically tuberculous patients using Besredka's antigen, although they still get 13 per cent. of positives in clinically non-tuberculous subjects. By comparing the von Pirquet and the complement fixation reactions they come to the conclusion that reactivity to tuberculin and complement fixation reactions are due to entirely different substances in the body, as many persons giving a strong von Pirquet reaction are negative by the complement fixation test.

The sedimentation test in India with special reference to tuberculosis has been reported on by Dr. C. Frimodt-Möller and Dr. P. V. Benjamin of Madanapalle (*Tubercle*, November 1927), who studied this reaction in 500 persons, of whom 130 were apparently healthy, 282 tubercular patients, and the rest suffering from diseases other than tuberculosis. They found that the tropical climatic conditions produce a higher rate of sedimentation than in the West and conclude that the test is a valuable help in deciding the question of activity of tuberculosis when considered in due relation to the clinical symptoms of the patients, is of great prognostic value, and should be used as a guiding factor in the treatment, especially in treatment with artificial pneumothorax.

The well known influence of climate on the weight of tuberculous patients has been investigated by Dr. M. Kesava Pai and Dr. C. A. Venugopal (Seventh Congress, F. E. A. T. M.) for patients living in the hot climate of Madras. As elsewhere, there is a fall in the weight curve during the hot dry months, and a rise during the cooler humid months. The gain in weight indicates conditions most conducive to optimum metabolic activity, and loss of weight the opposite.

While considerable progress has been made by individual workers dealing with various aspects of the treatment of tuberculosis, there has hitherto been no combined effort for a determined policy for an organised attack on the disease in India, dealing with the whole problem in its manifold aspects. This would not be so if it were generally recognized that tuberculosis probably is a far more deadly enemy in India than most if not all the so-called tropical diseases, as shown by Sir Leonard Rogers to be the case in Calcutta. In a paper (*Indian Medical Gazette*, June 1927) Dr. C. Frimodt-Möller outlines a policy for a campaign against the disease. No scheme will be fully effective which does not include the three units, equally important, the sanatorium, the hospital and the dispensary; the first in suitable climatic conditions for treatment, research, and training of doctors and the education of the public; the second near all larger towns for treatment and isolation especially of advanced cases; the third chiefly in large centres of population for the detection of cases and the sources of infection. The beginning and the centre of the movement should be at least one efficient sanatorium in each province, but this must be closely followed up by a chain of small inexpensive hospitals and dispensaries. The watchword of the campaign must be education and isolation. The spread of tuberculosis cannot be checked merely by a general improvement of sanitary and social conditions, but will chiefly depend upon the strength and vigor of a direct attack on the disease and its sources.

A review of tuberculosis in India would not be complete without mentioning that there are now signs of an awakening to the seriousness of the situation. A sanatorium is being constructed near Ranchi by the Government of Bihar and Orissa, a Tuberculosis League is planning a sanatorium for the Central Provinces, the National Christian Council of the Punjab is selecting a site for a Union Mission Sanatorium; a similar institution is being begun near Miraj in Bombay Presidency and one small sanatorium by a Mission in South Rajputana. Bombay City and Karachi are now contemplating constructing sanatoria; both the Government of Travancore and a Christian body have schemes for sanatoria under consideration in that state. The Government of Madras is planning a big extension of the Tuberculosis Hospital in Madras in the near future. A small tuberculosis hospital has been established by a Christian body in Rajahmundry, and a Mission hospital for women in Bangalore is in process of conversion into a purely tuberculosis hospital. Finally, existing institutions, such as the Mission sanatorium at Pendra Road in the Central Provinces and at Madar in Rajputana, are working with reconstruction and extensions, and others such as the Union Mission Tuberculosis Sanatorium at Madanapalle and the sanatoria at Bhowali and Almora have increased their accommodation.

A still further paper which perhaps calls for remark is one published in our November issue by C. Krishnamurty on the value of intravenous injections of iodine in tuberculosis. On a study of 15 cases he reports that it is probably not of much use in advanced cases, but that it is of value in early cases—(where the difficulty in testing the value of this, or any other line of treatment, is that so many cases tend towards spontaneous recovery). It is of special value in surgical tuberculosis, whilst sodium morrhuate has proved to be of value in apyrexial cases, and especially when alternated with iodine injections.

DIABETES.

Only one paper published in India during the year calls for review, viz., that by Lieut.-Col. H. W. Acton and Dr. J. P. Bose, on the relationship of the colour of rabbits to their susceptibility to insulin. In rabbits of the same species but of different colours insulin causes a smaller reduction in the blood sugar in the albino than in black rabbits. In black Himalayan rabbits insulin administration produces hypoglycæmia, and the difference in reaction is due to the fact that the albino

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rabbit has hyperadrenia. The brown Belgian hare responds poorly to injections of adrenalin, and the rise of blood sugar after injection is only slightly above normal. There is a definite association between colour and species with regard to the output of adrenalin from the suprarenal glands. In albino animals this output is high; in melanotic animals it is low. These findings may have some applicability in the insulin treatment of diabetes in races of different colours.

"DEFICIENCY DISEASES," BERI-BERI, EPIDEMIC DROPSY, LATHYRISM.

Here there is a very considerable volume of papers to be dealt with, the most important being the contributions by Lieut.-Col. R. McCarrison, F.R.C.P.

General.—Col. McCarrison deals with the nutritive value of wheat, paddy, and certain other food grains. Whole wheat he finds to be of high nutritive value, whole rice to be of comparatively low value. These differences depend not so much on their proteins as on the content of vitamines and mineral salts. Parboiling, milling, polishing and other processes reduce the nutritive value of rice still further. Thus it is obvious how very poor in nutritive value is the rice diet which is the staple diet of so many millions in India. The superior physique of the races of Northern India is closely correlated with their wheat diet, also with the manner in which these races combine a wheat diet with such "protective foods" as milk, milk products, fruit and green vegetables. The best Indian dietary is one which includes whole wheat, sprouted gram, milk, milk products, and green leafy vegetables, with meat occasionally, as judged by experiments on the omnivorous rat. Every effort should be made to increase the cultivation of wheat in India, and to increase its use in adequate combination with the "protective foods."

The same author has studied the effect of manganese on growth. When ingested in large doses by rats, manganese dioxide exercises a progressively retarding action on growth, but in small doses it markedly stimulates growth; concentrations of the former order —1 part to 12,600 parts of diet—are harmful, concentrations of the latter order—1 part in 617,000—are definitely beneficial. A whole wheat diet provides the almost ideal concentration of these essential manganese salts.

The same author finally deals with what constitute good and bad diets respectively under tropical conditions, this paper being illustrated by a remarkable series of photographs of fed rats. In experimental rats a diet consisting of whole wheat, milk, milk products, sprouted legumes, uncooked vegetables and fruit, with fresh meat occasionally far surpassed in nutritive value one composed of white bread, tea, sugar, margarine, jam, boiled vegetables, and tinned meat to which the usual preservatives had been added. The maladies of which the bad diet is so apt to lay the foundations are lung disease and gastro-intestinal disorders. Faulty and ill-balanced food appear to often be the precursors of such diseases in man. The commoner food preservatives, such as boracic acid, formalin and sulphurous acid, may contribute their share towards the harmful effects of such a faulty diet. The "white-bread-margarine-and-tea diet" is singled out as perhaps the most unsuitable and disease-favouring diet of all.

Beri-beri and Epidemic Dropsy.—Here a considerable number of papers call for review. In our issue for July, Col. Acton and Major Chopra, sum up their experimental work which has now extended over several years on the rice infection theory of epidemic dropsy. There is a close association between epidemic dropsy and the wetting of rice by sudden storms or floods which allow decomposition to start in the rice, such decomposition producing the poisonous pressor bases which, on ingestion by susceptible persons, produce the disease symptoms. The excessive humidity of the monsoon months is also dangerous when rice is stored in stacks and in ill-ventilated godowns. The characteristic diarrhœa of the disease is due to the action of these water-soluble bases causing exfoliation of the mucous membrane of the gut, together with œdema of it. The damage to the mucosa permits intestinal cocci and bacilli to invade the blood-stream, and this gives rise to fever; such cocci are frequently excreted in the urine and can be recovered on culture of a catheter specimen of the patient's urine. The stools in the acute phase of the disease show large numbers of Gram-positive organisms, a condition which is not met with in the stools in health. The "rice bacillus" can be cultivated from the stools of these patients provided that the culture medium contains no bile salts. It is possible that infections may occur of the stomach or duodenum with these organisms —but only under rare and exceptional conditions—and under such rare conditions epidemic dropsy might be transmitted from person to person by fæcal contamination when contact is intimate. This paper is based chiefly upon a study of the 1926 outbreak in Calcutta—an outbreak which was foretold by Col. Acton from the epidemiological conditions present, and which he attributes chiefly to a sudden and unexpected downpour in May at a season of the year when much of the rice for the Howrah godowns was in transit in open boats on the Hooghli. After this, the normal monsoon rainfall was delayed until July 22nd, when there was an abnormally heavy downpour; the incidence curves for epidemic dropsy in Calcutta follow the curves for rainfall at an interval of some 5 to 7 weeks later.

In our issue for May, S. L. Sarcar and B. M. Gupta describe a most interesting outbreak at Sandwip Island situated in the Bay of Bengal about 25 miles from Chittagong. The island is a very fertile one and the inhabitants have a plentiful supply of milk and fresh vegetables, and avitaminosis is not known. All the 25 cases which occurred did so in the town of Sandwip or its environs and were within a radius of 1½ miles of one another. There was tremendously heavy rainfall during August, 1926, especially at the end of the month. The outbreak of epidemic dropsy followed closely after the cessation of this very heavy rainfall, and was in general of a mild but typical character. The gunny bags used for storing rice had come from Barisal—an infected area; most of the rice consumed came from suspected areas and was stored under conditions extremely favourable to rice infection, and the whole outbreak pointed to the importation of either infected rice or of infected rice bags from Barisal, where epidemic dropsy had been raging previously.

Still a further outbreak is recorded from the Fiji Islands in February, 1927, by A. D. Sagayam. The outbreak was in general of mild type, but œdema was a marked symptom and the cases were very slow in clearing up. Rice and dâl are imported into the islands annually in bulk from Calcutta, and in point of time the outbreak followed a few months after the autumn 1926 outbreak in Calcutta. These authors describe the special association of sarcoids—hæmorrhagic new growths of nævi-like character—with the outbreak, a fact which has been further investigated with reference to the Calcutta outbreaks by Col. Acton in the *Indian Journal of Medical Research.* The former writer is strongly inclined to incriminate contaminated mustard oil, and the official medical authorities in the island concluded that the outbreak was due to this cause; but it is clear that the imported rice was not above suspicion.

Still another localised outbreak is recorded by Dr. I. R. Anderson in our issue for February at the U. F. C. Mission in Khulna, Bengal. Here the evidence in favour of person to person infection is very strong indeed. There had previously been no evidence of the existence locally of the disease; it followed immediately after the arrival of infected persons from Calcutta; there was no apparent connection between the rice supply and the incidence of the disease, and where an explosive outbreak might have been expected if the local rice supplies were infected, none occurred.

It is difficult to sum up the evidence afforded by these papers, but Col. Acton's work and views appear to

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afford a clue to the entire riddle. Normally, he claims, the outbreaks are due to rice stored under damp, hot, and humid conditions, which becomes infected with the "rice bacillus" (such infected rice being easily detected by a simple water test, or still simpler glycerine test); the infection produces poisonous pressor bases in the infected rice, and on ingestion of this poisonous rice *in susceptible persons*—i.e., in those whose normal hepatic and endocrine defence mechanism has been lowered—these bases, as has been proved in experimental animals, can produce all the symptoms of epidemic dropsy. On the other hand the "rice bacillus" apparently can occasionally and exceptionally establish itself in the intestinal tract of certain persons, when person to person infection may occur, via the contaminative method. Control of rice storage conditions should lead to the prevention of the disease, which has little or nothing to do with avitaminosis.

Dr. A. E. Coyne of Kistna gives a general account of the symptomatology of beri-beri and its treatment, especially advocating the use of marmite and tea made from rice polishings. A vegetable diet is also added and the patients taken completely off rice if possible. Massage is mentioned as of special value in the control of the pains in the limbs and for persistent paresis. C. Ray has investigated the general and biochemical blood picture in epidemic dropsy. Usually there is leucocytosis of mild degree, and as judged by hæmatocrite readings a definitely hydræmic condition of the blood. The blood coagulation time is about normal, but the total nitrogen and protein values are much below normal. Indican is commonly present in the urine. Retention of chlorides is associated with the œdema of the disease, and this author again draws attention to the association of the disease with new angiomatous swellings on the skin. The blood calcium and cholesterol content are lowered, and the globulin content is markedly increased, together with diminution of the albumin content of the blood.

Lathyrism has been the subject of two papers. Lieut.-Col. T. C. McCombie Young has been studying the disease in its endemic home in Central India under the auspices of the Indian Research Fund Association, and the summary of his paper is a valuable one in summing up our present knowledge of the disease. When the legume *Lathyrus sativus* (*matra* or *khesari dâl*) which is generally sown with the wheat as a precaution in case of a dry year and the failure of the wheat to germinate, is the predominant article in the diet, then lathyrism becomes prevalent. Famine years, associated with partial starvation and avitaminosis, are years particularly favourable for lathyrism. A community suffering from lathyrism is also in a state of marked nutritional instability due to lack of the protective food substances, notably vitamine fat-soluble A. Night blindness is also notoriously prevalent in company with lathyrism. In general deficiency diseases and lathyrism suggest significant resemblances. In villages where the Mohamedans eat as much *khesari dâl* as their Hindu neighbours, but supplement their diet with other substances, lathyrism is unknown. Lack of milk and of green vegetables may be contributory factors. To prohibit the cultivation of *khesari dâl* is impossible, since the villagers rely on it in seasons of scarcity. This paper is a very valuable one in its general and impartial summing up of the situation; and it is obvious that either a food-intoxication or a food-deficiency theory will meet the facts adduced. It has a good bibliography and is illustrated with useful photographs which show the typical attitudes assumed in different stages of the disease.

In our issue for April, Major L. H. L. Mackenzie gives notes on some cases of suspected lathyrism which he encountered in the Gilgit Agency. Males only are affected, and the disease is locally attributed to eating *gharash* (the local name for *Lathyrus sativus*). Grain grown on newly cultivated areas is said to be especially poisonous, and not that grown on previously tilled fields. The sex incidence—attacking males only, of all ages—appears to be peculiar.

GOITRE.

Here of course the chief contributor is Lieut.-Col. R. McCarrison, F.R.C.P., whose principal papers have been published in the *Indian Journal of Medical Research*, with summaries of them in the *Lancet* and *British Medical Journal*. He records the production in experimental rats of a new type of goitre which is unrelated in its origin to iodine deficiency, whilst ætiologically, pathologically, and epidemiologically it differs from the chronic hypertrophic or adeno-parenchymatous type of endemic goitre and from the diffuse goitre of endemic origin. The basal factor in its causation is a diet containing more than 60 per cent. of white flour or of vitamine-poor carbohydrate, 20 per cent. or less of protein, with fats and inorganic salts (including iodine) in adequate amounts, but no green vegetables or fruit. This type of goitre is associated with intense secretory activity which ultimately leads to exhaustion of the secretory epithelium and its replacement by non-secretory and fibrotic elements. These changes may indeed be present without any alteration in the size of the thyroid gland. Sporadically, this type of goitre may be found to occur amongst white flour eating peoples, and its subjects will be prone to develop Graves' disease after such influences as fright, mental worry, lactation, and infectious diseases, whilst those in the retrogressive stages of the disease may show myxœdema. The administration of iodine is not expected to prevent the onset of this type of goitre, but a well-balanced vitamine-rich diet should.

The same author details the further history of goitre at the Lawrence Royal Military School, Sanawar, Simla Hills—a continuation of his former studies at that School. His previous claims were that the goitre at this school was due to bacterial contamination of the drinking water supply to the school and that the disease could be checked by the introduction of a chemically and bacteriologically pure water supply. Such a new water supply was provided in 1918. The result is claimed to have been that goitre, which has been endemic at Sanawar for 70 years, has now virtually disappeared within three years of the introduction of the new supply. The soil in Sanawar is poor in iodine, also its water supply. The former water supply actually contained more iodine than the present supply, and the present improvement cannot therefore be attributed to an increased iodine content in it. It is apparently the bacteriological purity of the new supply which is responsible.

Col. McCarrison, with Major Clive Newcomb, Mr. B. Viswanath, and Dr. R. V. Norris, D.SC., have also investigated the relationship of endemic goitre to the iodine content of soils and of drinking waters. This refers only to the classical type of goitre, parenchymatous goitre. They conclude that in sea coast, submontane and montane (ex-Himalayan) regions in India where goitre is unknown the freedom of these areas from goitre bears no relationship to the iodine content of the soil. Incipient goitres occur in areas where the iodine content is high. In Himalayan areas where the adeno-parenchymatous type of goitre is of high incidence the iodine content of the soil is in general very low. The water supply of a given place may contain an appreciable amount of iodine and yet goitre be endemic therein. The substitution of a bacteriologically pure water supply in place of an impure one has caused the rapid disappearance of goitre, although the new water supply contained less iodine than the former one. On the other hand, the disease is less likely to arise in iodine-rich localities in Southern India than in iodine-poor localities in Himalayan India. The essential cause of this type of endemic goitre, it is claimed, is unhygienic conditions of the life of the people, and especially impurity of their drinking water supply. A deficiency of iodine under such conditions is favourable to the development of the disease.

By way of treatment of goitre Sub-assistant Surgeon A. V. J. Reddi claims good results after intravenous injections of sodium iodide. Only five cases are cited, but the results bear out the contention of a former

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contributor—Lieut. E. A. Davies, I.M.D.—that this method is one of the readiest and most efficient available for the treatment in general of goitre.

NERVOUS AND MENTAL DISEASES.

Perhaps the most interesting paper of the year is that by Lieut.-Col. H. W. Acton on *neurasthenia* in the tropics. The chief underlying factor in these cases he believes to be depression of the endocrine system, which may follow acute fevers, chronic intoxications, or the absorption of toxins from an intestine ulcerated by the action of Flexner's bacillus, or more rarely *Entamœba histolytica*. In the last group of cases the entire bacterial flora of the gut seems to show a marked departure from normal. Heat and humidity play their part and the ordinary European dress is unsuitable (in the male sex) for tropical conditions, whilst the Oriental is wiser than the Westerner in keeping to two meals a day taken in the morning and evening. Lack of ventilation owing to houses being shut up to keep out the heat, and the poor quality of the food in Indian bazaars are further factors, whilst some take too much exercise and others too little. The earliest symptoms are those of hypothyroidism, with lowering of the basal metabolism, a dry skin and loss of hair. With depression of the adrenals goes diminution in the tone of the whole involuntary muscle system, and often an increase in the normal pigmentation. Depression of the genital system leads to loss of sexual power and introspection. By degrees the patient passes into a condition of profound neurasthenia, showing introspectiveness, morbid anxiety, dread of the development of some fatal disease, and even actual phobias. The treatment of these cases is not easy, but the first essential is to secure the patient's confidence and co-operation; such patients are really and genuinely ill, and it is no good labelling them "neurotics." The case must be patiently and fully investigated, and the exciting and predisposing cause found out. Glandular therapy is of special value, but each case must be worked out on its own merits. Chronic bacillary or amœbic infection of the gut, if present, must be treated. In the discussion which followed Col. Acton's paper a variety of views was expressed, several speakers dwelling upon the sex aspects of neurasthenia, and others upon trauma and surgical operations as exciting factors.

Dr. F. H. B. Norrie records a very remarkable instance of cure of spastic paraplegia by induction of benign tertian malaria. The patient on admission had been unable to stand or walk for six months, and had a history of old standing syphilis. He was treated with "bismostab" and later by induction of malaria. Before dismissal he could walk a mile without sitting down and was in robust health and strength. The author attributes the recovery rather to the induced malaria than to the bismuth injections.

Major T. A. Hughes and Mr. D. L. Shrivastava, M.SC., have investigated the carbohydrate tolerance in two cases of muscular dystrophy. A high fasting degree of blood sugar was found, and defective power of storing glucose; the renal threshold to glucose was high in both cases, and it is concluded that the diminished glucose tolerance is due to the wasting and poor blood supply of the voluntary muscles.

Dr. W. Nunan of Bombay discusses *mental suggestion* as a remedial agent. He details cases of skin disease, of melancholia, of insomnia, of drunkenness, and of bad behaviour and kleptomania cured by suggestion, and makes a vigorous plea for independent investigation of the value of the method. He complains of the attitude of those who condemn suggestion without investigating its real value, to which he admits there are bounds. In a further contribution he complains of the barbarous methods of treatment of children for eneuresis, and emphasises that mental suggestion is of special value in such cases, even in adults in whom the habit had been ingrained since childhood.

Mental Diseases.—Lieut. O. A. R. Berkeley-Hill writes of new methods of therapy in mental diseases. The first is the induction of aseptic meningitis in cases of dementia præcox by intrathecal injection of sterile horse serum. Six patients were treated, but on the whole the results were disappointing. A second treatment tried was that of dementia præcox, melancholia, and imbecility by intensive courses of bromides. Doses up to 210 grains a day are given for a few days, the patients being under continuous observation, fed when possible and carefully nursed. Four cases were tried and all markedly improved. A third line of treatment tried was the artificial induction of malaria in cases of confusional insanity, general paralysis, manic-depressive insanity, dementia præcox, and anergic stupor. The last case was particularly unfortunate, for the patient was injected (twice) with bloods which were believed to contain only *Plasmodium vivax*, but died from a mixed infection with benign and malignant tertian malaria. The results on the whole varied widely; a patient with acute confusional insanity suddenly and melodramatically regained his mental health; a patient with general paralysis was completely cured; as was also a case of polyneuritic psychosis and one of dementia præcox; in other cases the induction of malaria failed to improve the patients' mental state. A fourth treatment tried was endocrine therapy together with administration of lymphoid substance in cases of asthenic dementia and insanity; three out of four patients treated showed marked improvement and two of them are now back at work and apparently cured. It is clear that the old rule of thumb methods of "treatment" of mental diseases are a matter of the past and that new lines of therapy are under investigation and may yield the happiest of results.

MEDICAL EDUCATION IN INDIA.

The thorny subject of medical education in India has been much discussed during the year, owing to the publication of Sir Norman Walker's report to the General Medical Council, and was the subject of an editorial in our issue for June by Col. Megaw. Much of Sir Norman's report is encouraging, especially his references to the splendid teaching in some of the Indian eye hospitals, and his friendly criticisms of our shortcomings will, we hope, be received in the same spirit in which they were made. Fundamentally, whilst medical education in India is on the whole good, there are three very adverse factors:—(*a*) The want of a sufficient basic general knowledge among the students on which to build. To some extent, of course, this difficulty is due to the fact that teaching has to be in a foreign language; yet there is no getting away from this difficulty, since textbooks do not exist in the vernaculars, and even if they did, it would be necessary to teach in half a dozen different tongues; hence English has to be the medium of instruction. (*b*) The want of uniformity among the syllabuses and their unfortunate copying of out of date and inappropriate syllabuses much more suitable for medicine in temperate zones; "the teaching in medicine, surgery, and midwifery is on lines similar to those followed by the medical schools in Great Britain twenty years ago." (*c*) To these we would add the fact that the teachers are often not in reality whole time men, but that a large part of their time is taken up with private practice. This may be unavoidable, but it seems to us to be especially unfortunate. It is difficult to see how matters are to be reformed, but we would agree with the *Statesman* that perhaps too much attention has been paid in this country to secondary education and too little to primary education. Efforts should be made to raise the general standard of knowledge of the students admitted so that they shall be receptive of new knowledge and interest, rather than haunted by the examination spectre. A well known Indian politician recently asked the reviewer "How is it that so many Bengalis make fortunes in the practice of the Law, and so few in the practice of Medicine?" The writer has long pondered on what should be the answer to this question, without finding one, so may take this opportunity of passing it on to his readers. The legal mind has been defined by a cynic as "that which comes to the most unforeseen conclusion by the most circuitous route." Is

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it that the dusty unrealities of the Law appeal more to some Indian minds than the vivid realities of medical practice; or is it that the Indian population is far more willing to pay for legal advice than for medical treatment?

Allied, perhaps, to the question of medical education in India is the subject of the *mofussil* dispensary, dealt with in an editorial in our issue for December. In our issue for January, Col. Proctor had certain criticisms to make, not so much of the men in charge of these *mofussil* dispensaries, as of the system which starves them of funds and adequate facilities and tends thereby to bring modern scientific medicine into disrepute with the population of India. To this Sub-assistant Surgeon, A. K. Bhattacharya replies vigorously, and we have attempted to sum up the discussion in our editorial. The position is an exceedingly difficult one, and one would hesitate to claim that the policy of opening up numerous minor medical schools in the *mofussil* districts is going to solve it. We understand, for instance, that in the town of Burdwan alone there are 17 Calcutta M.Bs. engaged in private practice, and about 30 other medical practitioners of lower qualifications. That India needs as many qualified medical practitioners as she can get is a truism, and the number of applicants for admission to the big medical schools and colleges is some ten times their teaching capacity, but even so the qualified men often find it extremely hard to make a livelihood.

The most urgent preliminary measure would appear to be the necessity for the creation of an all-India General Medical Council to raise and maintain the standard of medical education and examination in all the Provinces, but we hope that, should such a Council come into being, it will act not as a merely judicial body, but will do something to assist as well as to judge the legitimate and qualified medical practitioner.

MISCELLANEOUS.

In addition to the above subjects a number of miscellaneous papers call for review. In our issue for June, Lieut.-Col. J. W. D. Megaw and J. C. Gupta discuss the geographical distribution of some of the diseases of India; typhoid fever is common all over the country; relapsing fever is shown to have a much wider distribution than was previously suspected; whilst the incidence of the dysenteries is surprisingly low. The maps which illustrate this article are made out in accordance with the replies received to a general questionnaire sent out all over India, and, whilst the information therein recorded is undoubtedly incomplete and sometimes perhaps inaccurate, the whole paper is a very valuable one and gives us something to go upon. In any general campaign against the more important tropical diseases in this country a knowledge of the geographical distribution of the diseases concerned is clearly of primary importance.

Dr. Gordon Roberts gives an interesting account in our issue for February of the well known Welsh Mission Hospital at Shillong, and of its work. This splendid hospital is one of the finest and best run in India and shows how valuable to this country is the work carried out quietly and unostentatiously by the medical missions in India.

The medicinal treatment of *gastric and duodenal ulcers* is dealt with by Major H. Hingston. He emphasises the invariable presence of pain as a diagnostic symptom, of a history of melæna on cross examination of the patient, of slight abdominal rigidity and of abdominal tenderness on deep pressure. *X*-rays and a fractional test meal are valuable aids in diagnosis, though not often available. By way of treatment a modified Sippy programme is detailed which is less laborious to carry out than the original one, and which seems to give good results. He is of opinion that medicinal treatment of the condition is palliative, rather than curative, and that "surgery seems to be the only hope."

In our issue for December, Noor Husain records a very interesting case of extensive scalding in a young child followed by acute abdominal symptoms on the ninth day, which proved fatal on the twelfth day. The case appears to be one of those rare cases of duodenal ulceration following after a severe burn or scald.

Anæmia has been the subject of two papers published during the year. Dr. P. V. Gharpure deals with the pathology of pernicious anæmia as studied in a series of post-mortem examinations at the Grant Medical College, Bombay. The pathological picture in general is a constant one and varies only degree. The peripheral blood shows a few normoblasts, megaloblasts, and anisocytosis; the bone-marrow shows overgrowth and megaloblastic reaction, whilst overgrowth absorbs the compact bone. The heart, kidney, and liver show fatty changes; the spleen is fibrosed; the intestine is pale and smooth, and small petechial hæmorrhages are seen in almost all the organs. Capt. P. N. Basu analyses the causation and blood picture in cases of anæmia among the troops in Bombay. He finds a marked deficiency of free HCl to be constantly present on gastric analysis, whilst there is a disturbance of the normal ratio of neutral fat to free fatty acids in the stools. The fragility of the red blood corpuscles is about normal, and whilst the blood calcium content is lower than the usually accepted figures for Europeans, it is not markedly different from that for healthy Indians. Bacteriological examination of the stools showed the presence of large numbers of putrefactive and fermentative organisms, which proved to be pathogenic in type on inoculation into laboratory animals. The enquiry was closed down prematurely, but the indications are that auto-intoxication from the intestine may play an important part in the causation of idiopathic anæmia in the tropics.

Cystitis.—G. Panja and K. Banerjee have been investigating the bacteriology of cystitis. Contrary to the usually accepted belief, they find that the *Bacillus coli communis* is not the organism most frequently present. Both lactose and non-lactose-fermenters were isolated, and all organisms present were of intestinal type. These may enter the blood-serum either in septicæmic states and be excreted in the urine without producing cystitis, as is so commonly the case in the enteric fevers; or may enter the blood-stream through ulcers in the gut, and be excreted in the urine, as is commonly the case in epidemic dropsy, chronic dysentery of whatever type, and "mucous colitis." In the female, further invasion may take place from the urethra. Streptococci are not infrequently present in cases of chronic dysentery and in epidemic dropsy. Autogenous vaccines and treatment of the ulceration in the intestine are often followed by very good results.

Major T. A. Hughes and Mr. D. L. Shrivastava have made a study of *renal œdema*. Sixteen chronic cases were observed and determinations made of the capacity of the kidneys to concentrate urea and chlorides, of the chloride, urea and cholesterol content of the blood, of the ability of the kidney to excrete water, and of the urinary changes. In two cases primary retention of water seems to have been the cause of the œdema, in the other cases the dropsy seems to have been of pre-renal origin, due to abnormal permeability of the capillary endothelium to water and salt. In one case of pure nephrosis and in one of nephrosis with very early nephritic changes considerable improvement was effected by a high protein diet and large doses of thyroid extract. The same authors have studied *post-malarial cirrhosis of the liver*. The clinical picture in some of these cases strongly resembles that of alcoholic cirrhosis, but alcohol can be excluded as a contributory factor in many cases. In the early phases, there is increased fragility of the red blood cells in hypotonic saline solutions; in advanced cases this fragility disappears and may be replaced by increased corpuscular resistance. Splenomegaly accompanies the hepatic cirrhosis, and perhaps the hypertrophy and multiplication of the reticulo-endothelial tissue is an expression of immunity acquired to repeated attacks of malaria.

Snake Bite.—B. N. Rao pleads for a more extensive use of antivenene in cases of snake bite, giving details of two cases in which doses of 40 c.c. appeared to be of value. The biting snakes were not identified, but in the

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second case a previous fatality had occurred from a bite from what was apparently the same species of snake.

A special feature of the year with regard to tropical medicine was the publication of *The Life and Work of Sir Patrick Manson* by Dr. Manson-Bahr and Lieut.-Col. A. Alcock, I.M.S. (retd.). This has been reviewed in our columns; as also in the *Tropical Diseases Bulletin* by Dr. Andrew Balfour. Dr. Balfour notes that the book hardly gives that living picture of Manson which all of his former students cherish, "yet it would be ungracious and unfair to find fault in any way with the fine tribute the joint authors have paid to Manson's memory because this rare and elusive gift is not in evidence. They have given of their best and have produced, not only a sound and interesting book, but a fitting testimony in text and illustration to one who did much for Science and even more for humanity."

SURGERY IN THE TROPICS.

Lieut.-Col. W. L. Harnett, F.R.C.S., very kindly contributes the following review:—

The surgical section of the Far Eastern Association of Tropical Medicine produced a disappointingly small array of papers, but several of these dealt with matters of great importance. Major-General Hooton, I.M.S., read a paper on the choice of operation for vesical calculus in which he deplored the increasing tendency to substitute suprapubic lithotomy for litholapaxy. The speaker attributed this to the trend of current teaching in Europe and America, but the subsequent discussion showed considerable difference of opinion as to the causes of the change in practice. All the speakers agreed that litholapaxy is the best operation in suitable cases, but considerable experience is necessary in selecting the right cases and considerable practice in the actual performance of the operation. Litholapaxy is a dangerous operation in cases where there is a co-existing enlargement of the prostate, or where the kidneys are gravely damaged by chronic pyelonephritis, to mention only two of the common causes of trouble. The increasing exactitude of the diagnosis of urinary disease by means of the cystoscope, by kidney function tests and by radiographs has tended to reduce the number of litholapaxies, by eliminating cases which are now recognised as bad risks for this class of operation. The reviewer is of opinion from a study of recent literature and from observation of the practice in genito-urinary clinics in London and Paris that there has been no real change in the opinions of urologists, the change is in the increased precision of preoperative diagnosis. As regards general surgeons it is difficult to generalise, as the recent increase of genito-urinary special departments is gradually transferring all these cases in Europe to the hands of specialists. The necessity for considerable practice in order to master the technique of the operation is the real determining factor in India, and it is for this reason that litholapaxy is not so popular in Bengal as it is in the Punjab, where the cases are so numerous that the operation is often done in the out-patient department, a proceeding which one would think risky, but apparently it has the approval of the patients. The high cost of the necessary instruments for litholapaxy, when compared with the few simple instruments required for the suprapubic operation, is another point in a country where the cost of equipment has to be cut down to the bare minimum on which a hospital can be kept going at all, and where the layman and not the medical man has the last word in the matter of financial provision. The question is one which has been brought up repeatedly in the columns of the *Indian Medical Gazette* during the past few years and General Hooton's paper is welcome for the help it may afford in drawing attention to a retrograde movement, whether his diagnosis of the cause of it be correct or not.

Lieut.-Col. Sir Frank Connor opened a discussion on filariasis, in which he stressed the need for research on the treatment of the early stages of the disease. He was followed by Dr. K. K. Chatterjee who dealt with the pathological aspect of the question, but none of the speakers who followed had much that was new to say. The subject is in a stagnant condition at present, but work is in progress at the Calcutta School of Tropical Medicine and we have no doubt that the next few years will see some advance.

The paper on gastric and duodenal ulcer which was down in the name of Dr. Wanless was replaced by one by Col. Bradfield. The Madras General Hospital has acquired a great reputation in this field and the figures which Col. Bradfield brought forward were very striking, especially when compared with the figures showing the small number of these cases treated surgically before he started work. In order to get the cases he had to go to the out-patient department himself and see the cases of "dyspepsia" being treated there, but once the initial inertia was overcome, a steady and increasing stream of cases began to come clamouring for operation. In a recent number of this journal Major Hingston has drawn attention to the great prevalence of this disease in Bengal and the wide field lying waiting for surgeons. The subsequent discussion followed the usual lines of a surgical meeting, questions of technique, after-treatment and the choice of cases for resection being much to the fore, but it transpired that what Col. Bradfield really wished was to initiate a discussion on the causation of gastric ulcer and it had been intended that Col. McCarrison should explain his views on the rôle of nutritional deficiency in its causation, but unfortunately he was occupied elsewhere.

Dr. K. K. Chatterjee brought forward some examples of chronic peritonitis due to amœbiasis and Capt. Nigam showed on the cinematograph the steps of his operation for drainage of epidemic ascites by means of a tube of fascia lata, that wonderful tissue of amazing vitality, whose surgical possibilities are only just beginning to be exploited.

Turning now to the papers published during the year, we have first a short but important paper by Capt. Hayes in which he attempts to grade liver abscesses according to size, laying down rough rules for treatment by emetine alone, aspiration and emetine, or siphon drainage on this basis. Useful as this method is, it must not be forgotten that there are grades of virulence in hepatic amœbiasis as well as in other infections and that size of the liver is not the only criterion. Lieut.-Col. Roberts contributes useful papers on some common injuries of the knee-joint and on infections of the kidneys, in which he advises nephrectomy for acute fulminating pyelonephritis when unilateral, but does not stress the care which must be taken to ascertain first that the infection is unilateral before this advice is followed. Kelyanvala has a paper on the treatment of ascites by permanent drainage into the subcutaneous tissues by means of silver tubes. One case only is quoted but this subject was dealt with in the surgical section at the Far Eastern Association of Tropical Medicine and it would appear that these cases are more amenable to surgical treatment than the ordinary form of ascites and cirrhosis met with in Europe. Dr. Panja's paper on the bacteriology of cystitis is unsatisfactory, because we are not told whether the cases were primary or secondary to kidney infection and whether they complicated any other lesion of the genito-urinary tract. Capt. Barret contributes a short note on spurs of bones commonly met with in radiological practice with some useful illustrations. Dr. Frimodt-Möller's paper on tuberculosis dispensaries and sanatoria, though primarily of medical interest, should be read by all for its emphatic condemnation of the waste of money which results from the multiplication of tuberculosis dispensaries in large towns and the account of the results which may be achieved at comparatively small cost when the problem is tackled in the right way. Major De's report on the post-mortem examinations of the bodies of the victims of the Calcutta riots is of great interest, on account of the high percentage of penetrating stab wounds which injured an important organ and the numerous cases in which multiple injuries were found and in which surgical treatment was hopeless. In one curious case the only lesion was a small wound behind the mastoid, but the spinal canal had been opened and the vertebral artery

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divided. Major Hance has a short paper on the value of sigmoidoscopy in the diagnosis of chronic dysentery in cases where the laboratory findings are negative and to check the results of treatment. This valuable method which owes much to the advocacy of Manson-Bahr is not yet sufficiently made use of out here. Dr. Chakravarti's case of periaterial sympathectomy in the *Calcutta Medical Journal* is interesting, but the case would appear to have progressed too far to permit of this method of treatment, as is generally the case in this country. Lieut.-Col. Harnett's paper on the walking caliper splint draws attention to a most useful piece of apparatus as yet hardly known out here.

We have commented before on the tendency of contributors to write up cases which they would find to be commonplace if they would only consult some book used by students for the higher examinations before writing. Instances this year are reports on cases of excision of the elbow, parovarian cysts, and liver abscess.

Of case reports there is such a plethora that the task of sorting them out is very difficult. Christian's account of a successful operation for a fibroneuroma of the cauda equina in the hospital at Bangkok easily takes first place. Reports of cases of recovery after abdominal wounds are numerous. Drs. Varma, and Abdul Samad Khan amongst others describe cases which illustrate the wonderful recuperative powers of the peritoneum, in Dr. Khan's case late intestinal obstruction necessitated a secondary operation. A remarkable case of double intussusception, one of the ordinary ileo-cæcal type and the other a retrograde colic one which recovered after operation is recorded by Pillai. Of foreign bodies there are numerous instances, the best being the case recorded by Dr. Jwala Prosad of the removal of a mass of raw caoutchouc from the stomach of a patient who had been taking the latex of the banyan tree for two years as a tonic. Dr. Norrie removed a pice which had dwelt in the œsophagus for two months and Dr. Sharma an iron ring $3\frac{1}{2}'' \times \frac{3}{4}''$ which had to be removed from the penis by means of a file. A scorpion is an unusual inhabitual of the ear, but Dr. Seshachalan records an instance of the removal of one. Dr. Hukam Chand Gupta's case of gangrene and death following the crushing of a stone impacted at the neck of a bladder shows the unwisdom of performing any major urinary operation in the presence of acute or chronic retention; the latter should first be relieved and the major operation performed later when the acute condition has quieted down. Eleven stones in the bladder as recorded by Mamabud Din is very remarkable. Other unusual conditions are Major Vaidya's case of cyst of the mesentery, Dr. Chatterjee's case of universal surgical emphysema following a fractured rib, described in a most amusing manner, Dr. Reddi's successful treatment of goitre by intravenous injections of sodium iodide, Dr. Bhaskara Ram's use of subcutaneous injections of a 25 per cent. solution of magnesium sulphate in cases of tetanus where serum is not available, Major Mukherjee's case of bony ankylosis between the jaws in a case of cancrum oris, and Dr. Dutt Gupta's case of cirsoid aneurysm of the dorsalis pedis artery. Altogether a good year well above the average in the output of surgical literature.

Apart from Col. Harnett's review above, certain other papers perhaps call for review. Amongst these—although perhaps scarcely surgical in aspect—is Col. McCarrison's series of papers on the experimental production of *vesical calculus* in rats fed on a certain diet, published *in extenso* in the *Indian Journal of Medical Research*, and abstracted in the *British Medical Journal*. These papers continue work first begun by the Japanese observers. In his first paper Col. McCarrison shows that stone-in-the-bladder resulted in rats fed on diets commonly used by man, the faults of which were: (*a*) absence of proteins of animal origin; (*b*) relative deficiency in vitamine A; (*c*) excess of earthy phosphates; and (*d*) a possible toxic action on the urinary tract of one ingredient in the diet. In his second paper the results published in the first were confirmed, and in general the conclusion is reached that a diet consisting of whole wheat flour, linseed meal, cornflour, salt, and calcium phosphate is very potent in causing stone-in-the-bladder and its sequelæ. The main faults of this diet are its high content of cereal foods and phosphates and its deficiency in vitamine A. In these respects the diet approaches in quality that used by the inhabitants of those areas in Northern Indian where vesical calculus is common. In his third paper Col. McCarrison finds that the addition of whole milk, in the proportion of 2|3rds oz. per rat daily to the former diet capable of producing urolithiasis in 50 per cent. of young rats, completely prevented the development of phosphatic calculi. These results may be fraught with tremendous importance, for it is shown that suitable dieting may prevent the development of vesical calculus, and the addition of fresh milk to the dietaries in Northern India should not be impossible.

Carcinoma is a subject which has attracted some attention in India during the year. Lieut.-Col. J. A. Shorten gave a most interesting account of a visit to the Curie Foundation in Paris and of the successful treatment there of cases of malignant disease of the cervix uteri, tongue, and larynx by exposure to massive doses of radium. The percentage of inoperable cases cured of carcinoma of the cervix has risen from 5 per cent. in 1919 to 25 per cent. in 1924, and of operable cases from 22 per cent. to 71 per cent. The latter figures are very striking when one considers the seriousness of the condition. Radium therapy, however, is a two-edged sword and if employed in insufficient quantities by inexperienced persons may do more harm than good. Dr. Gharpure writes on the incidence of primary carcinoma of the liver, as studied at post-mortems at the Grant Medical College, Bombay; whilst many cases diagnosed as being primary cancer of the liver are in reality secondary to smaller growths elsewhere which are easily overlooked, yet—in conformity with Sir Leonard Rogers' findings for Calcutta—he makes out a strong case for regarding primary carcinoma of the liver as being definitely more common in India than in Europe. R. P. Ghosh records a case of rodent ulcer of the face cured by three injections of "Collosol" selenium.

With reference to *abdominal surgery* a few cases reported in journals outside India by workers in this country call for comment. Capt. R. H. C. Pryn, R.A.M.C., records the case of a British soldier admitted to hospital with an enteric-like fever. The *B. pyocyaneus* was isolated from the blood-stream, however, and sudden perforation of the ileum occurred. This proved fatal in spite of immediate operation, five days later, and at autopsy the *B. pyocyaneus* was isolated from the intestinal contents, spleen, and the lymph nodes. A second patient was a British soldier admitted with typhoid fever, and *B. typhosus* isolated on blood culture. The fever relapsed and perforation ensued. He recovered after immediate operation, and Capt. Pryn writes of the special value of morphia injections after operation in such cases. In a third case of typical enteric fever, without perforation, the *B. pyocyaneus* was isolated in blood culture; and it would seem that—like the streptococcus, which is a not infrequent invader of the blood-stream through typhoid ulcers in the gut—the *B. pyocyaneus* may also play a similar rôle.

Lieut.-Col. W. F. Brayne and Dr. A. I. Simon record an interesting case of pedunculated submucous fibromyoma of the stomach. The patient, an Anglo-Indian female, aged 32, was suspected to be suffering from gastric ulcer, with hæmoptysis and melæna. The tumour was discovered and removed at operation, and the diagnosis of fibromyoma made by Lieut.-Col. J. Taylor of the Pasteur Institute, Rangoon. Dr. J. D. Dhruv, M.S., F.R.C.S. (Eng.), records two interesting cases of *acute hæmorrhagic pancreatitis* in the *Lancet*; the first patient presented rather vague abdominal symptoms with pain and tenderness and fever and died on the 7th day; the condition was only found at autopsy. In the second patient the onset of symptoms was so gradual that surgical treatment was only advised on the 7th day,

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and only permitted by the relatives four days later. At operation acute hæmorrhagic pancreatitis was found, and the patient did not survive the shock of operation. Both cases illustrate the fact that the onset of acute hæmorrhagic pancreatitis may be insidious and slow, and not always sudden and dramatic.

S. R. Moolgavkar attributes the formation of white clot within aneurysmal sacs to stagnation of a small portion of the blood within the sac which is not affected by the systole-diastole of the heart. Major M. Morris, R.A.M.C., records an interesting case of aneurysm of the posterior tibial artery following a fracture of both bones of the leg in an Indian sowar. The aneurysm was first noticed seven weeks after the fracture had been set and occurred in the middle of the calf, just at the site of the fracture. At operation the sac of an arterio-venous aneurysm was found adherent anteriorly to the periosteum; it had hollowed out the tibia into a cup-shaped depression. Operation was followed by completely successful results. The author notes that at first he thought that the aneurysm might be the result of direct violence applied to the part, but the fracture was the result of indirect violence and due to the patient catching his foot in an irregularity in the ground and falling.

Cases of acute glossitis with sudden onset are recorded by A. B. de Castro and S. K. Bhave, whilst Hyderali Khan describes two curious cases of ankyloglossia or extensive adhesion of the tongue. The first patient was an Indian female of 48 who had been treated with very large doses of mercurial salts by a hakim; acute salivation and glossitis had followed and the tongue was finally fixed in a position slightly protruding from the mouth and very extensively bound down to the lower jaw. The second patient, an Indian female of 55, had also had acute mercurial stomatitis, and this was followed by adhesion of the tongue along its entire left border to the left cheek. Both cases were relieved by operation.

A feature of the year was the publication of Dr. K. K. Chatterji's *Tropical Surgery and Pathology*, which was reviewed in our columns; and also in the *Tropical Diseases Bulletin* by Mr. J. J. Pratt. The latter reviewer remarks that such a textbook was badly wanted and that this volume will be most useful to house surgeons and to medical practitioners generally throughout the tropics.

Sub-assistant Surgeon P. B. Rau continues this year the melancholy story of tetanus in the *mofussil* with no antitetanic serum available, or the serum so expensive that neither dispensaries nor patients can afford it. In the absence of the antiserum, he advocates alternate subcutaneous injections of 20 minims of a 2 per cent. solution of carbolic acid, and of 20 minims of a 25 per cent. solution of magnesium sulphate; two injections of each being given during the first few days.

Dentistry is perhaps not surgery, but the plea in our issue for June by Mr. C. F. Badcock for the creation of a Dental Register, for a Dental Act for India, and for the establishment of an indigenous dental profession in India is one which, we feel certain, will evoke wide sympathy. Madras Presidency has led the way in this matter in India so far, but up to date nothing but the merely preliminary steps have been taken.

VENEREAL DISEASES.

The chief event of the year was the visit to India of the official deputation of the British Social Hygiene Council, consisting of Dr. David Lees and Mrs. Neville Rolfe. The lectures in Calcutta were very well attended and of very great interest. The venereal disease problem is probably considerably worse in the big cities of India, where only the mere fringe of the subject has so far been touched, than in the big cities of Great Britain where full and well organised facilities for modern diagnosis and treatment exist. Syphilis is rampant in this country, the general incidence of a positive Wassermann reaction is about 15 per cent., and the particularly severe effects of syphilis as a complicating factor in such tropical diseases as malaria, kala-azar, and leprosy make the position a specially difficult one in India. Something will have to be done about it sooner or later, we suppose; but, as with everything else, it is all a question of funds, men, and organisation. We doubt whether as many as one per cent. of cases of syphilis in this country ever receive adequate treatment, though it is probably true to say that the terrible tertiary cases which used to be seen so frequently in India in the pre-salvarsan days are now not encountered.

Very few papers call for remark. Major P. Power, R.A.M.C., has an extremely useful article, which was abstracted in our columns, on the toxic effects of the arsenobenzol compounds, with instructions as to how to avoid them and to treat them when they occur (*Journ. Roy. Army Med. Corps*, Jan., p. 46). S. R. Naidu claims that potassium silver iodide is of special value in the treatment of gonorrhœa. The salt is prepared by mixing one part by weight of crystallised potassium silver iodide and four parts of potassium iodide in strengths of 0.5 grm., 1.0 grm., and 1.5 grm. (we presume of the potassium silver iodide) in 20 c.c. of sterile distilled water. For acute cases the anterior urethra is first washed out twice with 10 c.c. injections of the weakest strength; then 20 c.c. of the same strength is injected and the glans bandaged so that the fluid is retained. In chronic cases 20 c.c. is slowly injected so as to fill the posterior urethra, the glans firmly bandaged, and the injection retained for from 15 to 20 minutes. If stricture is present dilatation is necessary before the injections can give good results. It is claimed that the method is painless and efficient; some six or seven injections leading to the disappearance of gonococci, even in the exudate obtained after prostatic massage.

Yaws continues to be a subject of discussion, and Dr. G. C. Ramsay discusses the introduction of yaws into Assam. He claims that all the evidence available, historical, geographical, and racial, points to an importation from Burma via the hill tribes of Assam. The *chako* of the Manipuris, the *saighree* of the Kukis, and the *chakaura* of the Nagas are all yaws, and are the equivalents of the *purru* of Malaya and the *kwe-na-bow* of Burma. The recent discovery (so far unpublished) during the year by Dr. E. Muir of a focus of yaws in the Singhbhum District on the Bengal-Bihar borderline is of interest in showing that yaws may have spread even further, and have invaded Bengal. A group of cases was encountered, the patients sent to the Calcutta School of Tropical Medicine for examination, and *Treponema pertenue* found. Clinically, these cases were typical of yaws, and not of syphilis; whilst they had been previously mistakenly diagnosed as leprosy.

HYGIENE AND PUBLIC HEALTH.

International.

Col. J. D. Graham, C.I.E., Public Health Commissioner with the Government of India, very kindly contributes the following review of the year.

In the past two issues of *The Indian Medical Year*, I have given a résumé of the progress of international health work in so far as it affects this country. In the following note, I shall endeavour to bring this information up to date for the year 1927.

The scope of the Eastern Epidemiological Bureau of the League of Nations at Singapore has steadily progressed and its utility is more and more recognised by the public health, especially maritime, services of the East. It continues to issue by wireless from Saigon and Bandoeng a weekly summary in code of the prevalence of infectious diseases at ports and information regarding the movements of infected ships; this message is picked up in India by Jutogh and is then disseminated at once by the Public Health Commissioner to all major ports and a few others in India. At present 137 ports of Asia, Australasia and the East Coast of Africa are sending weekly information to the Bureau, all of which is incorporated in the broadcast message sent out from Singapore.

This summary is re-broadcast by five wireless stations in the East and by the Nauen station in Germany.

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A résumé of the message is also broadcast in clear by Bandoeng (Java), Tokyo, Madras and Karachi so that the information may be picked up by ships at sea throughout the East. The extended use of wireless broadcasting has very greatly diminished the expenses of the Bureau and bids fair to allow of a continuation of the Bureau's work once the Rockefeller subsidy has been withdrawn.

The Bureau further issues by post a weekly statement (fasciculus) giving information *in extenso* regarding the distribution of infectious disease and other matters important to the maritime public health services within its radius of activity.

As the representative of India, I presided over the meeting of the Advisory Council of the Bureau at Singapore in January 1927, and again at the meeting in Delhi in December 1927. In addition to framing the budgets of the Bureau, the Committee has dealt with the regularisation of the position of this regional Bureau *vis-à-vis* the parent Health Committee of the League, in view of its accepted permanent character. These meetings of representatives from Australia, China, Federated Malay States, Indo-China, Japan, Netherland, East Indies, Siam, Straits Settlements and the Philippine Islands result in extremely useful suggestions and discussions for increasing the Bureau's utility.

The Council further investigated the possibilities of co-ordinating research work in the East. It realises that the development of this activity must be slower than in Europe. At the meeting in January 1927, the international co-ordination of work on oral vaccination and research on plague was discussed and in connection with the latter an expert plague committee was nominated. This committee held a joint meeting with the Far Eastern Association of Tropical Medicine Congress in December 1927, from which resulted a resolution of the Congress and later one by the Advisory Council Eastern Bureau detailing in order of priority the investigations that are urgently required in connection with plague. The resolution of the Advisory Council is being communicated to the League of Nations Health Organisation at Geneva for communication (if approved) to the administrations which it affects.

As representative of the Government of India, I attended the Session of the Office International d'Hygiene Publique at Paris in April-May 1927. At this meeting, I again took the opportunity of presenting personally notes by Indian workers on their researches, particularly on such work as had an epidemiological bearing, with which aspect the Office is chiefly concerned. The subjects of the notes included McCarrison's work on the experimental production of beri-beri, stone-in-the-bladder and a new type of goitre; the forecasting of plague epidemics (Forster); the efforts at the Haffkine Institute to increase the efficacy of anti-plague vaccine; the work on the transmission of kala-azar by the Kala-azar Commission and by the School of Tropical Medicine, Calcutta, and on plague by Goyle. Special interest was evoked by the communications on cholera research and bilivaccine experimentation by Russell, Tomb, Brahmachari and Saranjam Khan. The importance of these notes was considered to be too great for casual discussion, and their consideration was deferred to a later meeting for preliminary careful study by the delegates.

At this meeting, an agreement was reached with the League of Nations regarding the rôle of the Singapore Bureau in the transmission of information required for the Paris Office in accordance with the Sanitary Convention of 1926. Similar agreements were foreshadowed as regards the Pan-American and the Melbourne (Australasian) bureaux. An interesting proposal was also brought forward for the establishment of a Middle East Bureau under the aegis of the Egyptian Sanitary Maritime and Quarantine Board for the distribution of epidemiological intelligence in connection with the Hedjaz pilgrimage and other cognate matters concerning the countries in the Middle East.

Another international meeting which affected India was the International Rabies Conference held in Paris in April 1927, at which Lieut.-Col. J. Taylor, D.S.O., I.M.S., represented the Government of India. The Public Health Commissioner was also able to arrange for the delegation of Lieut.-Col. McKendrick, I.M.S. (retired), a former Director of the Kasauli Institute, who was chosen to preside over the Section dealing with treatment. Delegates from 26 countries attended the Conference. The most important subject of discussion was the best method of treatment from the point of view of eliminating paralytic and other accidents. Opinions from India, where greater numbers are treated than in any other country, carried great weight—in fact, India's experience practically dominated the Conference.

The Conference did not finally make a definite declaration as to the best method of treatment, but it provided for further experimental work by comparative tests on a large scale. Such work is at present being carried out at the Pasteur Institute, Kasauli, and has already advanced matters considerably.

The outstanding international event of the year for India was the meeting of the Far Eastern Association of Tropical Medicine Congress at Calcutta in December, followed by tours of delegates throughout India. This gathering of experts in tropical medicine from all parts of the world has given India's problems and her attempts to solve them a publicity that cannot but have a useful effect on our own people and workers, and will also facilitate our international health relations with the administrations whose delegates have studied our conditions at first hand.

In my last year's review, I mentioned that the League of Nations had organised their first interchange of health officers in the East, modelled on those which had taken place in Europe and America. The 1926 interchange was held in Japan. In 1927, the Government of India extended an invitation to the League to hold their second eastern interchange in India. The offer was accepted and an extensive tour comprising Delhi Province, Punjab, United Provinces, Bihar and Orissa, Bengal, Madras, Bombay and the Indian State of Mysore has been arranged to take place in the first seven weeks of 1928. Sixteen officials are attending from Australia, Netherland East Indies, New Zealand, Philippine Islands, Siam, Straits Settlements, Japan, Ceylon, Federated Malay States, Indo-China, China and Egypt. The tour will give the visitors an intimate insight into all branches of health activity in India.

The International Sanitary Convention of 1926 has not yet been ratified by the Government of India and further delays have occurred in carrying out the legislative changes affecting our major ports that will be necessary before India is in a position to fulfil her obligations under the Convention.

The Indian Research Fund Association, with its financial status restored, has been able to finance a large number of important enquiries with a practical bearing on the preventable diseases from which India suffers. The progress of these enquiries is familiar to all readers of the *Indian Journal of Medical Research* and the *Indian Medical Gazette* and need not be described here. An expert Research Committee, under the Chairmanship of Sir Walter Fletcher, K.B.E., Secretary, Medical Research Council, meets in India early in 1928, and their report on the proposed Imperial Research Institute for India and on the general policy of the future Research Department will be awaited with interest.

Enough has been said in the foregoing short note to show that internationalism in health matters is a firmly established and a steadily growing activity, with which India must indubitably continue to concern herself.

The appointment of the Simon Commission to investigate the working of the Government of India Act of 1919 has necessitated our taking stock of the various phases of public health development throughout the different provinces of India during the period since the institution of the Reforms. In this connection, a comprehensive survey is being undertaken for the information of the Commission.

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GENERAL.

Lieut.-Col. A. D. Stewart, Professor of Hygiene, Calcutta School of Tropical Medicine, kindly contributes the following general review.

If we were asked "What is the greatest obstacle to sanitary and medical progress amongst the masses in India?" the answer might be "Belief in a glorious past and in a blessed hereafter, and an indifference to the present." The real wonders and possibilities of human life on this earth are not yet realised by the masses in India; human life is held too cheap, produced too thoughtlessly and lost too lightly. Custom, prejudice, and sacerdotal authority still bind the great majority. The position is not without its parallel in history, and those of us who are interested in the physical regeneration of Indian peoples look for a sign of that leavening with which the whole will be quickened. Will the storm of indignation that the publication of a certain book aroused this year stir the people to a sense of regard and respect for Nature's physical processes?

In a notable debate in the Legislative Assembly on the Age of Marriage Bill, one member asserted that but for the British Government, those things would be done by Indians themselves. We wonder; but the freer discussions and expressions of opinions on child marriage, age of consent, widow remarriages, untouchability, etc., are hopeful signs that certain customs and views which, whatever their value in bygone times, are now undoubtedly impediments to healthful progress, are now beginning to be doubted and appraised as to their real value, apart from authority, tradition, custom and sentiment.

The year has not been particularly fruitful in sanitary legislation. The relation of the Reforms Act to health and sanitary conditions of India will be considered at the proper time by those specially appointed to do so, but we have a feeling that the advantages and opportunities given by the Act to provincial legislative councils have not been adequately utilised for constructive public health legislation, and that the responsibilities of freedom from central control in this respect have perhaps not been realised. In general administration the most notable advance has been the inauguration in Bengal of a rural public health organisation, based on the "thana" or police registration district. The Government of Bengal have agreed to the expenditure necessary to provide for each thana one assistant health officer, a sanitary helper and two menials. Already 100 such staffs have been trained and installed and another two years will probably see the completion of this network of preventive assistance. These staffs are under the District Board but will be inspected by the Public Health Department staff. Everyone agrees that a health staff in every province is a necessity, but there is at present no unanimity as to what form this staff should take as regards personnel and under whom it should work.

The Cantonment Act of 1924 was designed to give a more representative control over Cantonment affairs. As regards health, however, the new Act does not seem to have been precise enough in its definition of the Cantonment Health Officer, his duties and his relations to the Civil and Military authorities.

Most of the railways are now government institutions and the formation of Railway Medical Services, co-ordinated in staff, aims, and methods, should be one of the advantages of the formation of State Railways.

The health of school children and college students has attracted considerable attention. Major Webb in Simla has shown how successful a well designed scheme can be in Indian schools. The Calcutta University recommended compulsory physical training in all schools and colleges and also compulsory military training for all college students, and the former suggestion has been accepted by the government as a working principle.

The visit of the Social Hygiene Council to India stimulated interest in the treatment and prevention of venereal diseases work, though lack of funds would appear to be a likely deterrent to any active result of the visit.

Food and nutrition have received a considerable amount of attention. Col. McCarrison's work at Coonoor and his evidence before the Agriculture Commission have convinced most of the close relationship of diet to national physique and national character, and in both the central and provincial legislatures the subject of diet, foods, and foodstuffs has been intelligently and keenly discussed. The importation of large quantities of hydrogenated oils, probably all vegetable in origin, resembling *ghee* in appearance and taste, may not be without significance; for these are entirely lacking in vitamines A and D and the consumption of such oils in place of *ghee* over extensive areas may have far reaching and serious effects on the growth and physical condition of the coming generation. Major Hughes, Chemical Examiner with the Government of the Punjab, conducted some experiments which show that the fat soluble vitamines are entirely lacking in these oils. The problem is on a par with that of "butter *versus* margarine" in England and the same rules should apply. The sale of such fats cannot be forbidden; they are cheap sources of fats and energy, but the public should not be defrauded into thinking they are getting the more valuable food, and there should be no possibility of any such masquerading, or adulteration of *ghee* with these oils. The Madras Corporation have now adopted regulations and standards for the main foods. The Calcutta Corporation have also been provided with standards of purity under the 1923 Act. Bombay, so far as we know, is still behind hand. The Food Adulteration Act has now been applied to rural areas of Bengal, a very notable advance.

Important work has been carried on in the standardisation of *ghee* and other fats and oils in the Calcutta School of Tropical Medicine, and Dr. Brahmachari's paper on *ghee* standards was a valuable contribution to this question.

Water Supplies.—Calcutta is extending its supply of filtered water to give 57 gallons per head per day. The danger of putting new wine into old bottles has been illustrated by the serious contamination of the filtered water in some parts of Calcutta owing to old defective pipes laid in old sewers, and to the intermittent supply. Some people are concerned, however, about the Corporation bringing so much more water into the city without any adequate provision for taking it out, for most of it must go out again. The disposal of Calcutta sewage and its excess drainage is still a knotty problem. The Corporation have rejected the invitation to form a committee preliminary to a Main Drainage Board to deal with the riparian drainage. Experiments with activated sludge have shown that the Calcutta sewage, after 4 hours' aeration with a good activated sludge, would give a very good, stable and inoffensive effluent.

Bombay is chlorinating its main Tansa supply. Madras is still having trouble with its filters with the production of hydrogen sulphide and would appear to be shy of taking a bold step in purification. Cunningham in Madras and Taylor in Rangoon have contributed to our experience of the methyl red and the citrate tests for the coliform organisms found in water. This work is very interesting, but from a practical point of view does not take us much farther than Clemesha's original classification, with which these newer tests would seem to be in agreement.

Sewage Disposal.—The question of the disposal of sewage and storm water in Calcutta and Bombay are still in the same stage. The formation of a Main Drainage Board to study the drainage problems in and around Calcutta has received a check by the refusal of the Calcutta Corporation to appoint their engineers on a preliminary committee. This is a pity as most are agreed that such a Board would be of great assistance in improving the drainage conditions on both sides of the Hooghly, a very difficult and complicated problem. On the experience of Dacca, treatment on land has been applied to several new schemes in Bengal, at Tittaghar and elsewhere. Work on the activated sludge process has been carried on in Bangalore, Jamshedpur and at the Calcutta School of Tropical Medicine.

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Owing to the climate, the sludge difficulty in India is not so great as in Europe and the process would seem to offer very material advantages, especially for the treatment of septic tank effluent, the treatment and disposal of which has never been really practically satisfactory.

Cholera.—The work done by Russell in Madras is a valuable contribution to our knowledge of the epidemiology of cholera. Rogers' paper drew attention to the question of cholera as a whole in India. He is probably right in stating that there are several endemic areas in India in addition to Bengal, but Russell has questioned his conclusions as to the relationship of humidity. Mass inoculation for cholera is making headway, especially in Bengal, and Russell's assurance that the belief in the efficiency of this measure is based on sound argument has helped immensely in pushing propaganda measures. Bilivaccine would appear to be inferior to hypodermic injections as a protection. Brahmachari in Bengal has worked on the serological relationship of the non-agglutinating type of vibrio found in healthy people in endemic areas. In agreement with Tomb and Maitra he considers that the non-agglutinating vibrio has a close relationship to the agglutinating vibrio and is closely concerned in the production of cholera epidemics. More work and experience on this point is needed. d'Herelle's work on the bacteriophage of cholera carried out in India in 1927, if substantiated, is likely to be of great importance in dealing with the problem of endemic and epidemic cholera.

MADRAS.

Lieut.-Col. A. J. H. Russell, C.B.E., Director of Public Health, Madras, reviews the year in Madras as follows:—

During the year 1927, Government sanctioned the appointment of 1st class Municipal Health Officers for the Municipalities of Masulipatam and Cuddalore and of 2nd class health officers for 6 additional Municipalities. One additional District Health Officer and 4 Health Inspectors were also sanctioned for the new district of West Godaveri. At the end of 1927, 25 District Health Officers and 34 Municipal Health Officers were in employment. 47 of the 81 Municipal towns in the Presidency still have no Health Officer.

Prior to 1927, spasmodic efforts had been made from time to time by the Public Health Department for the better control and the prevention of malaria in the Presidency. The investigation units attached to the King Institute have been in constant demand during the last three years, but malaria was only one of a dozen diseases with which they were asked to deal. In order that systematic steps might be taken to deal with the problems associated with malaria, proposals were made in 1925 and 1926 for the appointment of a malariologist who would investigate malarial conditions in selected areas and advise the Government and local bodies as to the measures to be taken to reduce the disease from the areas investigated. The Government sanctioned, with effect from 1st April, 1927, a temporary malaria officer on Rs. 900—50—1,500, with an assistant, two laboratory attendants, and establishment. The Special Malaria Officer works under the direction and control of the Director of Public Health. Investigations have been commenced and have already been completed in four areas.

The experience gained by the Madras Health Council during the last four years of its existence has given valuable information as to the nature of the propaganda materials, e.g., posters, leaflets, etc., which are most appreciated by the people. Its work, however, was only made possible by donations from the Indian Red Cross Society and by grants from Government, whilst, during 1926, various contributions from local bodies were received. The demands for the Council's materials continued to increase so rapidly that, with the restricted funds at its disposal, it was found impossible to meet these. Moreover, practically the whole of the work fell on officers of the Public Health Department. The suggestion was therefore made that a propaganda section should be created in the office of the Director of Public Health to carry on the work of the Madras Health Council. The Madras Health Council agreed to dissolve and hand over their whole stock of lanterns and literature to the new section. The proposals were sanctioned by Government and with effect from 1st April, 1927, an officer with the necessary qualifications and with the necessary staff to assist him has been appointed. A small non-official auxiliary committee has also been formed to keep the department in touch with non-official bodies and societies whose activities include health propaganda work.

In order to organise and assist in the carrying out of anti-hookworm measures in the rubber and tea estates in the Presidency, Government sanctioned with effect from 1st April, 1927, for a period of two years the appointment of a 1st class Health Officer to work under the Director, Ankylostomiasis Campaign. An officer with the necessary qualifications has been posted and is carrying on his work with headquarters at Ootacamund with considerable success.

Vaccination and Small-pox.—Figures of mortality from small-pox during the last 5 years are given below:—

1923–24	22,626
1924–25	20,227
1925–26	14,498
1926–27	9,816
1927–28 (7 months)	4,567

Nearly two million people were vaccinated during the year 1926–27 with a success rate of 95 per cent. as against a rate of 94.7 per cent., 94.6 per cent. and 90 per cent. during the years 1925–26, 1924–25, and 1923–24 respectively. The lymph in use may be said to have the highest possible protective value.

During the year the Public Health Code (Vaccination) was revised and the new edition has been issued.

Some trouble with anti-vaccinationists arose in Tanjore and Chittoor districts during the year and propaganda work was done by the health staff to counteract their activities.

As the quality of vaccination work done by unqualified vaccinators in certain local boards and municipalities was not up to the mark, all presidents of Local Boards and chairmen, Municipal Councils, were asked to replace unqualified candidates by qualified men. Such of the local bodies as refused to do so were surcharged.

The vaccinators' equipment was also revised during the year.

National Health and Baby Week.—The National Health and Baby Week has become an annual function, and the 4th week in the Presidency was celebrated during the months of February and March 1927. As in 1926, widespread infection with cholera prevented the celebration in the district of Tanjore and in certain other rural areas and municipalities.

The week was observed in 7,007 centres, 28,485 lectures, including magic lantern lectures, being delivered on health subjects. In addition 67 cinema shows were given as against 9 in 1926 and exhibitions organised in 787 centres against 298 in the previous year. No less than 2,120 baby shows were held. A sum of Rs. 1,37,327 was collected and spent during the week.

Taken as a whole, the Health Week of 1927 was carried out more extensively and more successfully than in previous years. The District Challenge Cup was won by the Salem district, the Municipal Shield by the Cocanada municipality and the Union Challenge Cup by the Penukonda Union Board.

Public Health Act.—Government have dropped the proposal to frame a consolidated Public Health Act for the Presidency. The question of amending suitably the existing Local Board and Municipalities Acts is being considered and it is hoped that amending bills to these Acts will shortly come up for discussion in the Legislative Council.

Vital Statistics.—The estimated birth-rate is about 36.0 per mille, practically the same as in 1926. The death-rate from all causes is 23.8, the rate for 1926 being 25.6 per mille. The mortality from epidemic

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diseases was less than in the previous year except in the case of cholera.

This disease prevailed in a virulent form especially in two districts. In one of these districts (Nellore) the disease broke out shortly after the district was devastated by a cyclone in November.

A geographical survey of plague on similar lines was also completed. The history of the present visitation of plague from its first appearance in the Presidency in 1898 has been written. The endemic and epidemic foci of the disease were mapped out and its seasonal behaviour was investigated.

Malaria.—The Government of Madras have been pleased to accept proposals made last year for the appointment of a Special Malaria Officer to work under the Director of Public Health. As was pointed out in the notes for 1926, the appointment is only a resuscitation of work sanctioned as long ago as 1912 but interrupted on account of the war. The Government have further desired that the investigation into malaria and its problems should be carried out in the first instance in selected municipal towns and other areas known to be badly affected with the disease and that definite proposals for its total eradication or prevention which will be of a practical nature should be submitted to them so that they can take necessary steps in co-ordination with the local authorities. The appointment is made on a temporary basis for a period of two years; but it is hoped that in course of time as the work progresses, the Government will realise the need for permanent malaria organisation in this Presidency.

If this is done, they will only be falling into line with the active steps now being taken in other parts of India. In this Presidency vast tracts of rural country exist in which the ravages of malaria have restricted both social and economic advance.

The Special Malaria Officer commenced work early in July 1927, after having been deputed to Kasauli for a couple of months. He is assisted by an assistant surgeon who has undergone a course of training in malariology at Saharanpur. Malaria investigations in three municipal towns, namely, Bellary, Vizagapatam and Hospet, in the rural Union Town of Vriddhachalam and in the mining area in Sandur state in Bellary District have already been completed. These places may be taken as representing typical affected areas. Bellary is a town situated at about 1,400 ft. above sea level. It is the headquarters of the district called by the same name which forms the northern boundary of the Mysore plateau. This tract of country is largely hilly. Bellary town is both a civil and cantonment station, although its importance as a military station is now insignificant. Malaria here is intimately associated with the large number of rock pools and obstructed drainage channels on the top of the Fort hill separating the civil town from the cantonment, and with a feeder channel which runs along the irregular rocky bed to a large tank within municipal limits.

Hospet is another municipal town in the same district. There the problem of malaria is associated with numerous irrigation channels and wet cultivation lying in and near the northern parts of the town.

Vizagapatam is a sea-port town now coming into prominence on account of the new harbour which is in the course of making. The town is hemmed in between the sea and ranges of low hills. The offending water-places here are the hill streams which meander through the town towards the sea.

In Vriddhachalam, with its warm moist climate, the danger zone is constituted by pools along the course of a number of surface springs situated to the north of the town and running towards a river and by innumerable pools in the river bed itself which surrounds the town on the north and east.

The mining area in Sandur state affords a typical example of hill malaria.

In addition to making the routine malaria surveys of selected areas as stated already, it is proposed to carry out observations both in respect of the seasonal and other variations of anopheline fauna and the progress of anti-malaria works and their effects in the areas dealt with. It is also hoped to make a detailed study of the bionomics of anopheline mosquitoes in the Presidency.

Epidemiology of Cholera.—Statistical studies in the epidemiology of cholera have resulted in many interesting and useful discoveries.

In the first place the short and simple method of computing and reducing correlation coefficients(1) has made extensive statistical work in India a working possibility. Only those who have actually used this short method can realise its possibilities in correlation work.

The question of forecasting epidemics of cholera(2) has been answered by the application of methods enunciated by Bundesen and Hedrick. By means of this method a standard is established with which present mortality figures can be compared with those of previous months or years, the median being chosen as the average over the period of years considered. By this method it is possible to forecast epidemics of cholera well in advance of the actual occurrence and to keep a constant watch for the advent of epidemics. It is, therefore, necessary to organise preventive measures only in times of epidemics and money and effort in unnecessary directions at other times can be avoided.

This method may also be applied to other epidemiological data in India for the same purpose.

During the present year, the rôle of the climatic factors: rainfall, relative humidity, temperature and pressure in the occurrence and spread of cholera was further analysed. The results have been set out in full detail in "Epidemiology of Cholera (V)," which will shortly appear as a memoir in the *Indian Journal of Medical Research*. This memoir attempts to interpret the network of simple and partial coefficients of correlation of all orders with special reference to the endemicity and epidemicity of the areas considered. The conclusions may thus be summarised.

(*a*) Rainfall has no direct effect on the incidence of cholera, but merely assists temporarily in the distribution of infection.

(*b*) Relative humidity has a decided effect on the incidence and spread of cholera, but is dependent on temperature conditions.

(*c*) Temperature has effect only in certain areas and is dependent on humidity conditions of the atmosphere.

(*d*) Pressure has no effect except in the sense that all the climatic factors may be said to have some general effect.

(*e*) In general an atmosphere in which high relative humidity coincides with high temperature, accompanied by intermittent rains, is especially suitable for the spread of cholera epidemics.

(*f*) Some provinces of India are endemic, like Assam. Bengal, the Southern Districts of Madras Presidency and the banks of the great rivers, viz., the Ganges, the Brahmaputra and the Kavari. The epidemic indices,(3) the monthly mean and median deaths and the zero order and partial correlation coefficients for each area have all corroborated this classification.

(*g*) Outbreaks of cholera are primarily due to the existence of carriers, but suitable atmospheric conditions and fairs and religious festivals help in spreading the disease.

In this brief survey, it is impossible to present in any suitable abbreviated form, the large number of correlation coefficients which were computed and taken into consideration. As far as cholera epidemics are concerned it is of little advantage to try to locate the part played

(1) "A Short and Simple Method of Construction and Reduction of Correlation Tables." By Lieut.-Col. A. J. H. Russell, C.B.E., I.M.S., and E. R. Sundararajan.

(2) "Forecasting of Cholera Epidemics." By Lieut.-Col. A. J. H. Russell, C.B.E., I.M.S., and E. R. Sundararajan.

(3) "Forecasting of Cholera Epidemics." By Lieut.-Col. A. J. H. Russell, C.B.E., I.M.S., and E. R. Sundararajan.

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by any one climatic factor when the others are held constant.

Rainfall has clearly no effect. The other climatic factors are active rather than passive, and are of importance in determining the virulence of epidemics. In epidemic areas, the combination of high relative humidity with high temperature, accompanied by intermittent rainfall, constitutes a favourable atmosphere for the spread of cholera. In endemic areas, however, such a combination is not necessary either for its development or spread.

The provision of pure water-supplies, rapid collection and disposal of refuse and night-soil, the extension of health organisations and staffs, the immediate notification of outbreaks of the disease, are all important essentials which should receive more and more attention. The control of cholera by means of prophylactic inoculation has been tried in certain areas in Tanjore District. Analysis of the inoculation data has shown in somewhat conclusive fashion that protection against cholera is conferred by both the anti-cholera vaccine and by bili-vaccine, but that the former is more effective than the oral vaccine. Experience, however, has shown that it is entirely impracticable to undertake mass inoculation of the pilgrim populations even at the more important festival centres.

The bearing of the population problem(4) on the occurrence of epidemics is indicated by the well known principles of Malthus.

The only way in which control of cholera is possible in India lies in the co-operation of all concerned in the preservation of pure water-supplies, in the spread of knowledge of the rules of hygienic living. Only then will it is possible to hope for the control and eradication of this deadly enemy of mankind.

Relapsing Fever.—Cases of relapsing fever were reported during the year from Dharapuram Taluq of Coimbatore district and the Periyakulam Taluq of Madura district. A few cases were also reported from some of the tea estates in the Nilgiris district. These were mostly imported from Madura district. A campaign against relapsing fever has been started in Madura district and a sum of Rs. 2,000 has been sanctioned by the District Board for the purpose. The disease continues to be entirely confined to the poorest classes. The case mortality has been small and the spread of infection has been fairly well controlled, although the insidious nature of the infection and belated information of outbreaks have added to the difficulties.

Food Adulteration Act.—In his report on food standards under the Madras Prevention of the Adulteration Act, 1918, the Public Analyst pointed out that the Act was defective in certain respects and suggested certain amendments to the 1918 Act. An amending bill was presented to the Legislative Council and was passed into law in October.

UNITED PROVINCES.

Lieut.-Col. C. L. Dunn, D.P.H., I.M.S., Director of Public Health, U. P., reviews the year as follows:—

The year has been an exceedingly successful one for the Public Health Department of these provinces and there has been great expansion in the activities of the department in every branch.

Superintending Agency.—The Superintending Agency now consists of a Director of Public Health and six Assistant Directors. Until this year, four Assistant Directors were employed on routine duties in the four ranges into which the province was sub-divided, but this year a re-arrangement has been made and the province is now divided into three ranges, it being found that owing to the expansion of the district health service, three inspecting officers were sufficient to cope with the routine duties of the department. A new appointment to take the place of one of the abolished ranges has been made by putting an Assistant Director in whole time charge of the Hygiene Publicity Bureau, the activities of which branch have greatly expanded. The 5th and 6th Assistant Directors are in charge of the Provincial Hygiene Institute and the Malaria Branch respectively.

Provincial Public Health Service.—The Provincial Public Health service now consists of two classes.

Class I, officers possessing a Diploma of Public Health of the Lucknow University or an equivalent or higher qualification. Class II, officers possessing a License in Public Health of the U. P. State Medical Faculty or an equivalent or higher qualification. Officers of Class I fill the appointments of District Medical Officers of Health in districts and Municipal Medical Officers of Health in the first and second class municipalities. Officers of Class II fill the appointments of Assistant Medical Officers of Health in districts and Medical Officers of Health of Class III municipalities. The numbers of Class I Municipal Medical Officers of Health have expanded to 20 out of 21 sanctioned appointments. The numbers of Class II Medical Officers of Health have expanded to four out of ten sanctioned appointments. The vacant appointments are being filled as rapidly as fully qualified personnel becomes available.

The numbers of District Medical Officers of Health have expanded to 26 while the numbers of Assistant Medical Officers of Health are now 27. Thus more than half the province has been provided with a district health service and it is expected that the whole province will be staffed with fully qualified officers within two years, the only delay in expansion being the paucity of qualified officers.

These officers are now wholly paid by Government instead of being paid partly by the local bodies and they, therefore, have acquired the necessary security of tenure to make the service attractive and popular. Until this year these officers were appointed and dismissed by the local bodies, often for reasons quite unconnected with their professional abilities. This I consider one of the greatest advances that has been made in the Department for many years. The service of municipal sanitary inspectors still remains a local service, but appointments can only be made of qualified men from the approved list maintained in the office of the Director of Public Health and on salaries and conditions of service laid down by Government. The number of sanctioned appointments at present is one to 20,000 of the municipal population. The service of district sanitary inspectors is also local and now consists of 106 sanitary inspectors in 26 districts.

Provincial Hygiene Institute.—The new building for the Provincial Hygiene Institute which was sanctioned in 1926, is now nearing completion and provides accommodation for training 20 candidates for the Diploma of Public Health of the Lucknow University, 20 candidates for the License in Public Health of the State Medical Faculty, 60 candidates for the Apprentice Sanitary Inspectors, and 40 candidates for the sanitary inspectors certificates in each case of the U. P. Government. At present the institute is carrying on its training work of the future public health personnel of the province in restricted quarters provided by the King George's Medical College, and owing to lack of accommodation a far smaller number can be trained than is necessary for the needs of the province. The institute will also be equipped with chemical and bacteriological research laboratories.

Hygiene Publicity Bureau.—As stated above, the Hygiene Publicity Bureau is now the wholetime charge of an Assistant Director of Public Health, and excellent work is being carried out by the Assistant Director with the help of staff of one Medical Officer of Health of the first class and one of the second class.

Malariology Branch.—The Malaria Branch which consists of an Assistant Director and two first class Medical Officers of Health has carried out excellent work during the year, especially in connection with the construction of the Sarda Canal. The Assistant Director of Public Health (Malariology) is in addition Chief

(4) "Population and Public Health." By Lieut.-Col. A. J. H. Russell, C.B.E., I.M.S. Read before the Congress of the Far Eastern Association of Tropical Medicine, 1927.

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Medical Officer of the Canal, a convenient arrangement which has enabled him to control malaria among the large number of labourers employed to such an extent that in the opinion of the Chief Engineer, without his work the canal would have taken at least two years longer to build. At the headworks, which are situated in one of the most malarious tracts in India, viz., the sub-Himalayan terai, many permanent and temporary anti-malarial works have been carried out.

The anti-malarial classes for Medical Officers of Health lasting one month were held as usual and the numbers of officers attending were 10. During the year a complete anti-malarial survey of the remaining Tehsils of the Bhabar and Terai Government Estates was completed and on the recommendations of Capt. Clyde and his immediate predecessor, Lieut.-Col. J. A. S. Phillips, I.M.S., large sums of money are being spent by Government in rendering settlements in this tract non-malarious and in moving settlements from highly malarious areas to other areas more suitable for colonization. In addition, malarial surveys of several towns and rural areas have been completed.

Hardwar "Kumbh" Fair.—During the year the great "Kumbh" fair at Hardwar took place in March and April and the biggest gathering of pilgrims ever recorded are estimated to have attended the fair, the number on the 13th April being over 9,00,000. Complete and comprehensive arrangements for the prevention of epidemic disease had been organised for some considerable time beforehand with the result that every case of cholera imported into the fair was rapidly isolated and all contacts segregated with the result that only 58 cases of cholera occurred. These are treated in a fully equipped Infectious Diseases Hospital which has recently been completed and which contained an up-to-date bacteriological laboratory with the result that 32 recovered and 26 died. The chief problem in connection with huge pilgrimages of this description is to rapidly isolate the cases so as to prevent the spread of infection. Many were caught at the railway stations *en route* to Hardwar and others while dispersing from the fair.

Food and Drugs Act.—Great advances were made in the organisation of detecting the adulteration of food and drugs as compared with previous years. The Public Analyst examined 790 samples during the year up to date, as compared with 933 in the previous year, and 284 against 317 were found to be adulterated. The Act has been extended to many towns and to certain rural areas.

Vaccination.—The Bovine Lymph Depôt at Patwa Dangar issued 252,043 grammes of calf lymph during 1926-27 and 1,433,056 persons were vaccinated as compared with 216,107 grammes and 1,465,862 persons, respectively, in the previous year. The percentage of successful results in primary vaccination in 1926-27 was 94.79.

BURMA.

Lieut.-Col. G. G. Jolly, C.I.E., M.B., D.P.H., D.T.M. & H., I.M.S., Director of Public Health, Burma, reviews the year as follows:—

Malaria.—Surveys were carried out in Myitkyina, Mawlaik, Kyaukpyu and a village tract in the Yamethin District. Palliative measures in connection with trimming and oiling of Bhamo lake were also undertaken in October and November. Sanction has been received for the establishment of a Malaria Bureau in the Harcourt Butler Institute of Public Health under the charge of Assistant Surgeon Feegrade.

Kaws.—Surveys were carried out in the Mandalay and Lower Chindwin Districts, which have revealed widespread distribution of the disease in these localities.

Mak-Aw-Lam.—A Committee consisting of Col. Morrison, I.M.S., Major Smith, I.M.S., and Dr. U Tha Noo, was appointed by Government to investigate and report on *mak-aw-lam*, a supposed new disease in Burma, which has turned out to be mainly malaria. The Committee's report has been submitted to Government.

The Rangoon Health Enquiry Committee completed its work in February, 1927, and submitted a report to the Local Government.

Cholera.—There were 4,238 deaths against 6,182 in 1926. Nearly 90,000 doses of cholera vaccine were distributed.

Plague accounted for 3,454 deaths against 2,906 in 1926. Over 100,000 doses of vaccine were distributed as against 67,000 doses in 1926.

Small-pox was less severe, accounting for 1,274 deaths as against 2,399 in 1926. The Vaccination Acts were extended to the notified areas of Lashio, Kalaw, Loilem and Taunggyi in the Shan States and the Prohibition of Inoculation and Licensing of Vaccination Act was extended to the Myingyan District.

Vaccine Depôt, Meiktila.—Mr. G. H. Blaker, I.M.D., Director, Vaccine Depôt, Meiktila, was deputed to study the process of lymph manufacture at the King Institute of Preventive Medicine, Guindy, Madras, from 26th October to 17th November, 1927. Bacteriological examination and potency tests of the lymph have regularly been carried out at the Depôt Laboratory. The total number of doses of lymph issued during 1926–27 was 974,229.

Hygiene Institute.—The appointment of a whole-time Director for the Institute from the 1st March, 1928, has received the approval of the Finance Committee. Chemical and bacteriological analytical work in connection with public health is now being done at the Institute and the chemist to the Institute has been declared by the Local Government to be the Chemical Examiner for the purposes of the Burma Ghee Adulteration Act. Four sub-assistant surgeons of the Public Health Department are being trained at the Institute for the newly instituted Government License in Public Health.

Classes are also being held at the Institute for the normal students of the University College for their courses in School Hygiene. The Red Cross Society (Health Education Section) and the Infant Welfare Society hold their meetings at the Institute.

Scheme for full time health officers.—A scheme for the appointment of full time health officers in urban and rural areas on a half-pay grant system has been approved by the Local Government. A beginning is to be made in 1929 by appointing three 1st class and five 2nd class health officers. Full time health officers have already been appointed in Akyab, Prome and Pegu municipalities.

Health Officer for fairs and festivals.—A post of Health Officer to investigate sanitary conditions at fairs and festivals was sanctioned for a period of 17 months from the 1st October, 1927, and Dr. U Ba Kin, M.B., D.P.H., appointed.

Hygiene Publicity Bureau.—The appointment of the Hygiene Publicity Officer and his staff was made permanent from the 14th July, 1927. Two cinema films on "One Scar or Many" and "Public Health Twins at Work" were purchased for health propaganda work. A film entitled "The Village Well" dealing with a cholera outbreak in a village was prepared locally.

Public Health Engineering Department.—A proposal for creating a Public Health Engineering Department under the Ministry of Public Health is under consideration of the Local Government.

Food and Drugs Legislation.—A Food and Drugs Bill has been drafted and is under consideration by a Select Committee of the Legislative Council.

Venereal Diseases.—A delegation from the British Social Hygiene Council visited Burma during the year, and spent nearly a month in the country. Their report has recently been received by the Local Government.

A Bill for the better treatment and prevention of venereal disease is under consideration by the Local Government.

Leprosy.—Notifications extending the provisions of the Indian Lepers Act to the whole of Burma have been issued by the Local Government and the Local Government has sanctioned as an experimental measure for a period of two years the establishment of several dispensaries for the treatment of lepers in selected villages. Two private medical practitioners and three sub-assistant surgeons of the Medical Department were deputed by

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the Burma Leprosy Committee, to undergo special training in the treatment of leprosy in the Calcutta School of Tropical Medicine and Hygiene. A Leprosy Survey party of the British Empire Leprosy Relief Association arrived in Burma towards the close of the year to carry out a leprosy survey in the Chin Hills District. The Local Government has deputed four sub-assistant surgeons to work in co-operation with the party.

Miscellaneous.—Col. Bisset, Major Jolly, Dr. Crow and two assistant district health officers attended the Congress of the Far Eastern Association of Tropical Medicine held in Calcutta in December, 1927. Many foreign delegates to the Congress passed through Rangoon *en route* and were shown objects of medical and public health interest in Rangoon.

MISCELLANEOUS.

In our issue for October, we published a very important article by an anonymous contributor on the need for a well planned public health policy for India. We do not often publish anonymous contributions, but this article was written by a distinguished officer in the public health field, and the subject is most ably dealt with, whilst it is one of profound importance to India. The same issue also contained a covering editorial to the same article by Col. Megaw. Without desiring in any way to offer criticism, one may say that for many years the divorce between the Medical and Public Health Departments in the different Governments of India has retarded progress; whilst the fact that neither Surgeons General nor Directors of Public Health have the status of Secretaries to Government in their Departments places them in an inferior position where their recommendations perhaps carry less weight. Fortunately, with regard to the Imperial Government at least—and we think that we can say the same of the Provinces—the divorce between Medical and Public Health Departments is now at an end; for nothing could be more cordial than the relationships between the Public Health Commissioner with the Government of India and the Director-General, Indian Medical Service, and their offices, whilst the former officer is also Secretary to the Indian Research Fund Association. With medicine and public health transferred subjects, but medical research a reserved subject, the position is not an easy one, but any medical research worker of to-day in India who contrasts conditions as they now are with what they were in Sir Ronald Ross' day in India will recognise how deep a debt of gratitude he owes to the late Sir Pardey Lukis for his able re-organisation of the Medical Research Department in India. Conditions are now utterly different from what they were in Sir Ronald's day; there are the vast problems to be faced; there is financial provision for their investigation; equipment is not spared; the one cardinal difficulty appears to be to recruit men of the right type to investigate them. Here, again, we have to recognise the wise policy of Government in appointing the Fletcher Committee to go into the whole question and advise, though its report is bound to the subordinate to the report of the Simon Commission which will cover the far wider field.

In one particular matter perhaps there is a defect. The progress of medical discovery is almost continuous in this country, and if anything was wanted to encourage both Indian and European medical research workers in India, it has been provided in the enthusiastic comments on their work by our foreign visitors to the Far Eastern Association of Tropical Medicine Congress last December. But there does seem to be a hiatus between medical discovery and the application of results. To give a concrete instance, the mode of transmission of guinea worm infection is now well known and prophylactic measures are neither very expensive nor difficult of application. Yet guinea worm infection is still extremely prevalent in certain areas of India. We suppose that, as usual, it is a question of funds and personnel. India is certainly awake now to her malaria, kala-azar, leprosy, and tuberculosis problems; there has been an enormous amount of work on the prevention of hookworm infection, though roundworm infection is probably of more real importance in causing disease in this country. On a general review of the situation, whilst we cannot feel content with what has been done, yet very much *has* been done, and one cannot fail to realise this. Government is blamed continuously and in no measured terms by medical and lay newspapers, but the very stream of abuse is a measure of the success achieved. The "public health conscience" is the one great factor lacking, but it can be brought about by education, by inculcating hygiene in the schools. One of the most popular features in the life of India to-day is the cinema, and the potentialities of the cinema in educating the Indian populations in public health matters are almost immeasurable.

FOODSTUFFS.

A curious feature of the year has been the special attention paid to foodstuffs. A good example is the paper by Dr. B. B. Brahmachari and N. K. Chatterjee in our issue for July on the value of the "water nut" *Trapa bispinosa* as an article of diet. This is a water plant which is of great value as a supplementary staple food. As a food for invalids the fresh nuts are very suitable, whilst its flour compares favourably with such farniaceous foods as arrowroot, sago and rice. It has a high iron and phosphorous yield and may be of hæmatinic value, whilst it is very easily cultivated. A second paper dealing with foodstuffs is one by Mr. N. K. Roy on the quality of milk of some breeds of Himalayan cattle. He shows that the fat content in the milk from certain varieties of Darjeeling cattle is as high normally as 7.5 per cent., and deals with the factors which influence the quantity and quality of the milk yield. The Siri and Nepali cows are selected as being those which yield a very high fat content in the milk and are equal to English cattle in this respect, though inferior to them in the total yield of milk obtained.

Dr. B. B. Brahmachari deals with the constants of pure cow *ghi*. He claims that the butyrorefractometer reading is unreliable as a test for the purity of this article, but that the Reichert Wollny test is reliable. With the latter, if the reading is less than 19.5 c.c. the sample is certainly adulterated; if it is above 19.5 c.c. and its relation to the other two constants is upset, the sample is adulterated; and with Reichert Wollny values below 24 c.c. and *ghi* blended from products of a large number of cows, the chances of the sample being pure are negligible. Capt. D. R. Thomas deals with vegetable *ghi* (*vanaspati*), a Dutch preparation which is largely imported into India. He concludes that it cannot be used as a substitute for pure *ghi*, and cannot be given to infants and lactating mothers. It makes a good cooking oil, however, and is frequently used to adulterate genuine *ghi*. It is deficient in vitamines, but this deficiency could be made up by taking eggs or green vegetables such as spinach with it. As India cannot produce sufficient *ghi* for the requirements of her population, it is very desirable that these pure vegetables fats which appeal so much to the non meat eating races of India should be made more nutritious.

An interesting study of the production of soda water from the water of a deep tube well is given by Mr. N. L. Banerjee, M.SC. He concludes that for the manufacture of soda water from a tube well water having a high temporary hardness, the water should be softened with lime. The dose of lime added should be just sufficient to eliminate all the temporary hardness, excess or deficiency being inhibitory to the carbon-dioxide absorbing power of the water. The addition of soda-salt or sodium bicarbonate does not help to increase the absorbing power of the water.

Milk.—Lieut.-Col. C. Maddock, C.I.E., I.M.S. (retd.) deals in the *Lancet* with pasteurisation of milk. It is very doubtful whether pasteurisation is the ideal process. It diminishes the amount of diffusible calcium in the milk and reduces its value in the promotion of growth and weight in young children. Fruit and cod liver oil can be used to supplement this deficiency, but even with such additions pasteurised milk is not as growth

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promoting as "certified" milk, "Grade A, tuberculin-tested" and obtained under strictly aseptic precautions. In India it is not so much the tuberculosis danger in milk that is important, as the prevention of gross contamination. It is clear that pasteurisation is not the ideal remedy for this, but we fear that "certified milk" is an almost unattainable ideal in this country.

WATER-SUPPLIES.

Rao Sahib V. Govinda Raju has investigated the bacterial efficiency of mechanical gravity filters. He concludes that systematic monthly examinations extending over a period of two years, and occasional hourly examinations during the period of a whole day's run, show that the *B. coli* content of the filtered water bears a direct relation to that of the feed water, and that ordinarily the number of *B. coli* that succeed in passing through the filters constitute about 10 per cent. of those present in the unfiltered water. Where chlorination is not practised the raw water should be stored sufficiently long for it to reduce its *B. coli* content to approximately one per c.c. These gravity filters show a higher bacterial efficiency during certain times of the year when algal growths are more prevalent.

The same author has also investigated the causes and prevention of corrosion of iron pipes and tanks. Corrosion is chiefly brought about by large metal surfaces being exposed to large amounts of dissolved carbon dioxide, and the latter can be removed by the addition of a suitable amount of lime. The insoluble carbonates which are thus produced must be removed by some form of sand filtration, and pressure filters seem to be better in this connection than gravity ones. Storage tanks require to be systematically painted so that their water never touches the metal surface; the strainer system should also be similarly painted, and special attention should be paid to the inner coating of pipes. The introduction of algæ into the overhead tanks in the hope of its leading to the formation of a slimy coating on the inside of the pipes appears to be worth trial. The stagnation of water in the pipes at night is a common cause of corrosion of pipes, and pipes should be completely emptied at night when water is not in use. The custom of emptying the overhead tanks at short intervals and thoroughly scraping them is actually harmful and not beneficial, as it destroys the naturally formed protective coatings of algal scum.

Lieut.-Col. J. Taylor, Major C. de C. Martin, Sub-Assistant Surgeon J. V. R. Naidu, and P. N. R. Naidu compare the results of Clemesha's method and the test of citrate utilization as applied to the water-supplies in Burma. They conclude that Clemesha's method appears to give results which approximate most nearly to the sanitary circumstances of the water samples tested. The presence of citrate non-utilisers only or in large proportion in a water sample is not sufficient evidence of pollution. The combined use of the citrate, methyl-red, and Voges-Proskauer tests gives valuable information supplementary to the Clemesha classification and may give further information as to the possibilities of contamination. The grouping of organisms in classes according to their formulæ with all three tests should prove a useful guide. No definite opinion is hazarded that the power to utilise citrate has been acquired in water by organisms originally fæcal in origin. Tentatively it is suggested that when organisms are citrate utilisers and also produce acidity to methyl-red, they may be regarded with suspicion as possibly indicating pollution, though not of very recent origin.

Dr. B. B. Brahmachari deals with a simple method for estimating the available chlorine in bleaching powder samples. Details are given in his paper in our issue for May.

SMALL-POX AND VACCINATION.

A considerable discussion has taken place in our columns with regard to the incidence of arthritis as a complication or sequel of small-pox. G. S. Chawal records arthritis of both elbows following small-pox; T. S. Dakshinamurthi states that arthritis is a not infrequent complication, and may affect the elbows, knees, and hips; whilst P. N. Shah records a case where arthritis of both elbow joints followed small-pox.

Dr. J. W. Tomb discusses the differential diagnosis between small-pox and chicken-pox. He relies on the fact that in chicken-pox the vesicular eruption appears within 24 hours or earlier of the onset of the fever, whereas in small-pox it is delayed until 48 to 96 hours after the first onset of fever. "The differential diagnosis of chicken-pox and small-pox by means of the time interval elapsing between the date of onset of the fever and the date of outbreak of the eruption" he writes, "is accurate, simple, and unambiguous, and should be adopted by all public health authorities, since any intelligent subordinate can thus make the diagnosis quickly and accurately." This is contested by Khan Bahadur N. H. Choksy, who considers that Indian patients can only rarely state when fever first appeared, and who relies on the nature of the vesicles, the absence of umbilication, the absence of the papular stage and other signs to establish the diagnosis of chicken-pox; and by S. K. Biswas, who relies on the shotty hardness of the points of eruption in the diagnosis of small-pox.

Assistant Surgeon J. H. Theodore, I.M.D., comments on the treatment of small-pox by intravenous potassium permanganate, doses of up to 10 c.c. of a 1 : 500 solution being given, and experiments carried out both on rabbits experimentally and on human cases of the disease. No toxic symptoms were noticed after the injections, and the maximum dose tolerable is probably higher than that advocated. When given intravenously to rabbits the injections have a definite tendency to abort the evolution of vaccinia virus, whilst in man results are very encouraging. J. M. Ghosh comments on two cases of "alastrim" in Keonjhargarh Jail; both were intramural cooks in the jail, and it is difficult to see how the infection was contracted; in the first case daily crops of pustules appeared for 14 days, whilst both patients were only slightly febrile and both were susceptible to vaccination after recovery. The second patient was treated with injections of citrated blood from the convalescent first patient.

Dr. C. W. F. Winckel deals with the organisation against small-pox in the Netherland East Indies. Here results are truly amazing. As his diagrams show small-pox, from being a disease of major importance in the islands, has now almost become insignificant. The essentials are an adequate supply of virulent animal vaccine; qualified and trustworthy vaccinators; constant and intensive supervision by whole time health officers; co-operation on the part of everyone concerned; and a well planned system of vaccination and re-vaccination. Both vaccination and re-vaccination are compulsory by law; in Batavia the number of cases of small-pox in a population of 2,800,000 has decreased from 2,446 in 1914 to nil in 1925; in Bantam from 179 in a population of 900,000 in 1916 to nil in 1925; in Cheribon, with a population of 1,800,000 from 1056 in 1915 to 13 in 1925; in West Java with a population of 9,600,000 from 4,050 in 1919 to 38 in 1925 and 33 in 1926. These figures speak for themselves, but legal powers under the Indian Acts are unfortunately very much more restricted than those in the Dutch East Indies.

Lieut.-Col. J. Cunningham notes on the progressive degeneration of vaccine lymph on continued sub-passage through the same type of vaccinifer (calves). At the 1st, 2nd, 4th and 6th removes there is a definite increase in yield, but with successive removes there is a gradually increasing failure rate. It is obvious, therefore, that if a lymph of the highest potency is to be maintained, Nejland's original process of strict alternation of vaccinifers—rabbit, cow, buffalo—must be adhered to. Weight of pulp yield is not always a reliable guide to the potency of a lymph.

Dr. C. G. Pandit believes that the virus of contagious epithelioma of fowls, when passed in succession into calves and monkeys, can ultimately be converted into vaccinia virus. With calf passages alone such development was not effected, and the interposition of a monkey (*Macacus sinicus*) was necessary. The virus reacted

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negatively on both the skin and cornea of rabbits, but, as development proceeded lesions appeared at first on the cornea and later on the skin.

RABIES.

In our editorial in July, we attempted to deal with some of the more outstanding problems in rabies, quoting a very interesting letter from Dr. Turkhud. This has brought us two interesting replies. In our issue for October, Col. Cunningham, from the Pasteur Institute of India, Kasauli, records a clear and authenticated case of hydrophobia in man contracted eight months after the patient had been licked on abrasions on the hands by a rabid buffalo. This case appears to settle two important points: that infection can be acquired from the saliva of rabid herbivora, and that it can be acquired by contact of the saliva with abrasions only. The victim was a mason by trade and his hands were continually cracked. In our issue for December, L. F. Henriques, records the case of a person bitten by an apparently rabid camel, who had only one injection of anti-rabic vaccine, but escaped hydrophobia, whereas other persons bitten by the same camel, died from that disease. This, however, appears to be an instance of accidental escape from infection.

In the *R. A. M. C.* Journal, Capt. S. J. L. Lindeman, R.A.M.C., discusses the difficulties in the differential diagnosis between rabies and the nervous forms of distemper in dogs. Both diseases are very prevalent in India. In May, 1926, he had in his bungalow a cocker spaniel with two puppies out of a litter of ten, of which the eight others had been sold, and a fox terrier; all the dogs being well looked after, and it being certain that none of them had been bitten. On May 22nd, one pup had an epileptiform fit, frothed at the mouth, and thereafter had symptoms stimulating rabies, during which it wandered away and when recovered showed paralysis of the extremities. It was destroyed on the 30th May, and on examination at Kasauli, it was reported that Negri bodies were found in the brain sections. The second pup took ill with vague abdominal symptoms in June, and was also destroyed, although apparently healthy. No Negri bodies were found. A third pup of the same litter, which had been sold, took ill with fits at the end of June, and died on July 20th, on the 22nd day of disease; Negri bodies were found. The two adult dogs escaped all symptoms, but in the meantime all persons in contact with the first pup had undergone anti-rabic treatment. The question for solution is: Was this rabies or nervous distemper? Further, was antirabic treatment necessary? Also the incident led to the destruction of valuable pure bred dogs. We are afraid that in our present state of knowledge no definite answer can be given. Negri bodies occur in conditions other than rabies, but in very sparse and scanty numbers, whilst "suspected rabies" is usually considered enough to go upon to advise a course of prophylactic inoculations. Personally, we have given up keeping dogs in India, owing to their frequent exposure to infection with rabies, whilst we should not dream of undergoing antirabic treatment unless bitten by an animal which it was reasonably probable to state definitely was suffering from rabies. Some 90 per cent. of European patients at Pasteur institutes in India are to-day probably treated unnecessarily; the difficulty, however, is to say who is or is not at risk. With the Indian patients matters are totally different, for the vast majority of them are very definitely at risk.

The value of an etherised vaccine in prophylaxis against rabies is being investigated at Kasauli, and in the July issue of the *Indian Journal of Medical Research*, Lieut.-Col. J. Cunningham, Assistant Surgeon M. J. Nicholas, I.M.D., and Military Sub-assistant Surgeon, B. N. Lahiri, I.M.D., continue their investigation into this problem. With street virus brains subject to ether the virus may still be infective up to 72 hours of immersion; after this period the evidence for the persistence of living virus depends upon deaths which might have been due to an attenuated virus (or, possibly, in the reviewer's opinion, to a neurolytic response to inoculation of normal brain matter). If these latter deaths are to be admitted, then it must be admitted that virus exposed to ether may still be infective after 120 hours immersion but is killed after 144 hours' immersion. Street virus is far more resistant to ether than fixed virus, and the results in general tally with those recorded by observers in Europe.

Lieut.-Col. A. G. McKendrick, I.M.S. (retd.), continues his series of reviews of recent literature on rabies in the *Tropical Diseases Bulletin* for the year, a most valuable set of articles whose perusal is essential for information and reference to every worker on the subject, whether in temperate or tropical zones. The series is accompanied by a very full and complete bibliography, which lends its especial value.

OBSTETRICS, GYNÆCOLOGY, INFANT WELFARE.

Dr. Margaret Balfour, W.M.S., India, very kindly contributes the following notes.

A general review of recent advances in obstetrics and gynæcology appeared in the February 1927 issue, by Lieut.-Col. V. B. Green-Armytage. This deals with the various troubles met with in India during pregnancy and labour, such as heart failure, tuberculosis, pernicious anæmia, post-maturity, non-dilatable os, intracranial birth injuries, and antepartum hæmorrhage. It emphasises the importance of preventive medicine in obstetrics in India, and especially of ante-natal care. The author considers that the diet of pregnant women in India is often very deficient in vitamines, that this lowers their resistance to infection, predisposes them to infection after delivery, and renders their infants weak. For puerperal sepsis he recommends Hobb's treatment by intra-uterine injections of glycerine.

In dealing with gynæcology, he speaks of myomectomy for fibroids, hæmorrhagic ovarian cysts, variococele of the round ligament and uterine prolapse. He speaks of the necessity of a sense of pre-operative responsibility for gynæcologists in India, where patients so often come after considerable delay. There should be careful history taking and complete physical examination, including a renal function test. In important and elective operations a salt-free diet should be taken for ten days beforehand, and meat avoided.

In the issue for May, the same author contributes a special article on pelvic inflammatory diseases and pyosalpinx. During five years 13.6 per cent. of the out-patients attending the Eden Hospital, Calcutta, suffered from tubo-ovarian disease; 269 abdominal operations were performed, with a mortality of 6.3 per cent.; 250 patients were discharged cured and 19 died. Operation is not always required in such a large proportion of cases, as many patients recover under medicinal treatment. In India, however, patients come late and are often unwilling to remain long in hospital; hence more operations are performed than in the West. Clinically cases are divided into those due to gonococcal infection—80 per cent., and those due to streptococcal infection—20 per cent. He concludes by detailing advice as to surgical procedures in such cases.

In the issue for November, Col. Green-Armytage gives a most careful and valuable account of prolapse of the uterus. No less than 560 cases were seen in the out-patient department of the Eden Hospital, during the last five years, of which 245 were admitted for operation. The operations carried out were vaginal, with a percentage of 97.5 per cent. of cures, 0.8 per cent. relieved, and 1.7 per cent. deaths. The article is illustrated by a series of sections and diagrams, which includes the pelvis of quadrupeds as well as of man, and some particulars of treatment by the ancients are given. Present day treatment is discussed in detail, both as regards prevention and cure. Illustrations show the value of position and exercises. Readers are warned against the abuse of the pessary so frequent in India, and the different cutting operations are described.

In the issue for December, Col. Green-Armytage deals further with occipito-posterior presentations in labour. This condition appears to be far more frequent in practice in India than in England, and the fœtal mortality is some 20 per cent. as against 10 per cent. in the United Kingdom. The condition is often carelessly or

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ignorantly overlooked until "something has to be done"—that "something" only too often spelling disaster. The essential points in diagnosis are often non-engagement of the head, or when the head is engaged a tennis-ball-like prominence—the fœtal head—to one or other side of the pubic junction; an entire loss of resistance to the examining hands between the pubis and umbilicus, due to the anterior shoulder being well away from the middle line; and, above all, premature rupture of the membranes. If the case be seen before or in the early stages of labour, provided the head of the child is not overlapping the brim of the pelvis (and therefore an obvious case for Cæsarian section) the midwife should apply a Buist pad under doctor's orders, and details for this application are given. If seen in the first stage with strong pains and the membranes intact, morphia and scopalamine should be given and the bladder and rectum emptied. If the membranes have ruptured and with a non-dilated cervix, the Polak method of plugging the cervix with gauze soaked in glycerine may be worth trying. If the membranes have ruptured a long time previously and the fœtal heart sounds are below 110 per minute, a live fœtus cannot be delivered, and in such cases a cranioclast should be applied to the head, a weight extension of 4 lbs. applied to it by a string hanging over the end of the bed, and the patient thus left to deliver herself. If labour is advanced, patience is the wisest procedure, and in certain cases manual rotation may be applied. In these cases, the use of the de Lees' head stethoscope is very useful, for it enables one to listen to the fœtal heart sounds without soiling the hands. Such complications as rupture of the uterus are discussed, and the treatment of shock by intravenous injections of 10 per cent. glucose solution with injections of insulin. In India in general, however, the chief necessity is to train midwives to recognise the occipito-posterior presentation, so that they can at once report cases to the attending doctor, or have the patients conveyed to a suitable hospital.

Eclampsia.—The April number contains an interesting article by Lieut.-Col. C. A. F. Hingston and Dr. A. Lakshmanswami Mudaliar on eclampsia as seen in four years' work at the Madras Maternity Hospital, from January 1922 to June, 1926. During this period 220 cases of eclampsia were seen, an incidence of 1.73 per cent. amongst patients admitted. The condition was 4.5 times as frequent amongst primiparæ as in multiparæ. It always occurred during the second half of pregnancy, but tended to occur earlier among the multiparæ than among the primiparæ. The highest blood pressure reading was 220 mm. of mercury, the lowest 55; and the higher the blood pressure the greater the number of fits and the higher the incidence of coma. Albumin was present in the urine in 89 per cent. of the cases. The fits occurred during labour in 46.8 per cent. of cases, before labour in 27.6 per cent., and after labour in 25.5 per cent. Treatment was directed towards reducing the blood pressure; for this veratrone, 1 c.c., was given subcutaneously if the pressure was above 140 mm., or ½ c.c. if it was below it. Two doses were usually sufficient. This line of treatment is also useful in prophylaxis. Morphia was also given in doses of from ¼ to ½ grain, but after commencing the veratrone treatment less morphia was required. Accouchement forcé was never called for. Twenty-two deaths occurred, a mortality of 10 per cent.; and 64.3 per cent. of the infants were born alive.

A second paper by the same authors describes the treatment of *puerperal sepsis* as carried out in the Madras Maternity Hospital. Drainage and postural treatment are used, but curetting is never done. Anti-streptococcal serum was found valuable as a prophylactic, but was not of much use when sepsis had set in. Stock vaccines gave poor results. The value of autogenous vaccines was doubtful, owing to the delay in their preparation. A polyvalent vaccine was being tried. Bacteriological analysis showed that hæmolytic streptococci were responsible for most of the serious and fatal cases. The only other organism isolated in septicæmic cases was the *B. coli communis*. The vaginal douche may be of value in cases of sapræmia, but the intra-uterine douche is perhaps positively harmful and its use is hardly ever free from risk. An analysis of the bacteriological findings in such cases by Assistant Surgeon, J. H. Theodore, I.M.D., shows the overwhelming importance of hæmolytic streptococci in the causation of puerperal sepsis in India. Over 64 per cent. of cases yielded cultures of streptococci, some 6|7ths of which were of hæmolytic type. On the contrary, examination of the vaginal flora of normal healthy pregnant women yielded a streptococcus only in one patient out of twenty-one examined.

Anæmia of Pregnancy.—The pernicious anæmia of pregnancy, as a disease especially encountered in India, continues to attract attention. Suspending for the moment Dr. Balfour's review of the year, we must pay a word of praise to her most valuable article on this subject in our issue for September. This summarises her findings in 426 cases reported on, in answers to a general questionnaire, and in 150 cases which she investigated personally in Bombay. The disease is not unknown in Europe, but is so very rare that it constitutes a curiosity instead of a commonplace as in India. Pyrexia is a usual accompaniment; enlargement of the spleen was present in 18 per cent. of cases, and œdema was a constant phenomenon. Diarrhœa was present in 38 per cent. of cases, vomiting (of degree more severe than the normal vomiting of pregnancy) in 40 per cent., sore tongue in 31 per cent., and epistaxis in a few cases. The pulse was invariably rapid. The disease was most prevalent in patients of from 20 to 40 years of age, and the incidence greater in multiparæ than in primiparæ. The communities affected, possible seasonal variation, blood state, urinary and fæcal findings are analysed, and an account given of findings at post-mortem examination. Delivery is usually premature and the majority of infants (68 per cent.) are either stillborn or die within two days of birth. On the other hand, a peculiar fact is that infants which survive are normal, and that the affected mothers after delivery tend to make a most rapid and complete recovery, although the condition may recur in a subsequent pregnancy and prove fatal.

What is the causation of this disease which plays so important a part in midwifery in India? The patients chiefly affected are not necessarily those of poorer classes, and women workers in the mills are relatively free from it, whilst those who are compelled to lead a sedentary life are more subject. It is a disease of the cold weather rather than of the hot weather. The children, when they survive, are not affected. It is not due apparently to malaria, nor to dysentery, nor to hook-worm infection, whilst it has no special association with puerperal sepsis. Is it a toxæmia: either from the intestine, or from the products of conception? It is essentially a disease of the second half of pregnancy and a toxic origin would fit in best with the facts. (In this connection the notes above on the anæmia of males in Bombay as an expression of intestinal toxæmia may have some bearing.)

Whatever the facts underlying this most important disease of pregnancy in India, the condition obviously deserves very full investigation. Dr. Balfour is to be congratulated on her careful and extensive study of the condition, and the Indian Research Fund Association on securing the services of so well-trained and experienced an honorary worker in investigating the problem.

The pernicious anæmia of pregnancy is not confined to Bombay, for it is just as prevalent in Bengal, as an analysis of 42 cases seen at the Eden Hospital, Calcutta, by Major S. A. McSwiney assures us. Full details of these cases are given. The incidence in Calcutta works out at 1.7 per cent. of patients admitted. Hindus predominate, and the maternal mortality was 35 per cent. and the fœtal mortality 56 per cent. Over 30 per cent. of cases were among primiparæ, and the earlier the pregnancy the greater the liability to the disease. The condition is five times as common under the age of 30 as after that age; albuminuria is not a marked sign, though œdema is usual, and a tendency towards miscarriage or premature birth very marked; in fact it is

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unusual for a case to proceed to full term. The ordinary causes of severe anæmia, such as malaria, ankylostomiasis, kala-azar, can be excluded as the result of laboratory investigation. Syphilis may be a factor in some cases, and where a positive Wassermann reaction is given, anti-syphilitic treatment is often efficacious; but specific disease will not account for all cases. By way of treatment iron and arsenic, which seem to be assimilated better when given by subcutaneous injection rather than orally, are advised, a liberal diet, sunshine, and vitamines, whole blood transfusions, and where the Wassermann reaction is positive full anti-syphilitic treatment.

The paper concludes with a full discussion on this mysterious disease of pregnancy. Up to date there have been no biochemical investigations of the disease, so far as we know. Feeding on nearly raw liver is a most useful measure in conditions of very grave anæmia in males, and might prove useful in the pernicious anæmia of pregnancy. It is at least clear that the ætiology of the disease should receive thorough investigation, since it is of such great importance in midwifery practice in India. Even from the mofussil J. N. Ghosal in our issue for May speaks of it as a relatively common disease; about 25 per cent. of cases die during labour, another 50 per cent. within a week after delivery—usually in a condition of intense dyspnœa; whilst some 25 per cent. recover spontaneously after delivery; and death in a subsequent pregnancy is very common.

Dr. Margaret Balfour deals with the maternal mortality in childbirth in India in a special article in our issue for November. Particulars with regard to 11,343 cases of labour were received from large hospitals in different parts of India, and the results analysed and compared with similar figures for British hospitals. From this it appears that there is considerably more disease in pregnancy in India than in Britain. The anæmia of pregnancy and osteomalacia, so frequent in India, are practically unknown in Britain. Fewer cases enter hospitals in India for accidents of labour and delayed labour, probably on account of the lack of a proper midwifery service. The mortality in all classes of cases is higher in India. "The nature of the mortality is largely due to obscure diseases," she writes. "Careful medical research is needed to discover the causes and means of prevention of these diseases. As at least two of them are nearly unknown in Britain, medical practitioners who come out to India from that country are unacquainted with them and little attention is paid to them in Indian medical schools and colleges. Instruction in the diseases of pregnancy in tropical countries should form part of the curriculum of all schools of tropical medicine." Registration of *dais* and midwives, arrangements for their suitable inspection, should be enforced, and much more attention paid to the providing of ante-natal clinics. The purdah system appears to exercise a very prejudicial influence on pregnancy, but even in the most educated classes in India the mortality in childbirth is more than double that in England.

In addition to the above papers a number of individual case accounts have been published during the year, but do not call for special comment. The country *dai* and her ministrations are luridly commented on by T. N. Chakravarty in a letter in our issue for April; cases where hands or limbs have actually been pulled off the presenting fœtus are not uncommon; and the writer asks how long India is going to put up with such "barbaric midwifery."

A note on *Appendicitis in Indian Women* by Drs. Campbell and Patel gives details of the pathological investigation of 25 appendices operated on at the Lady Hardinge Hospital, Delhi. Of these 14 contained concretions and 23 contained fæcal matter. Cultures gave a growth of *B. coli*. One appendix only showed tuberculous infection.

CHILDREN'S DISEASES AND WELFARE.

An extremely interesting paper is one by Dr. G. A. C. Gordon in the *Journal of Tropical Medicine and Hygiene* on the health of European children in Malaya, and what he writes about Malaya applies with the same force to India. He combats the almost universal belief that European children should not be brought up in the tropics. "Taking into consideration certain peculiar advantages (of Singapore) as compared with other tropical countries, given good ante-natal and post-natal treatment, strict parental control and supervision of food and general welfare, and intelligent preventive and early curative measures, the European child could thrive and flourish, and continue to reside in Singapore and Malaya for a much longer period than is the case at present." He considers that European children could do well in Malaya up to the age of 9 years at least. At birth the European baby in the tropics is just as healthy and vigorous as those born in England. Up to the age of 4 or 5 the mortality rates are actually lower than the corresponding ones in Britain, owing to the rarity of certain zymotic diseases in the tropics, whilst tuberculosis and rheumatism have not to be faced. The "nervous child," however, is probably commoner in the tropics, whilst there are moral dangers to contend with. He considers that breast feeding is of great importance in the case of European children in the tropics; he prefers buffalo or goat milk to that of the cow in the tropics, since it is more nutritious. The unsweetened condensed milks are very good, and he quotes a dictum of Deeks, that "to judge from the reports received, lactogen seems to have solved the problem of infant feeding in the tropics." With the gradual passage to a child's diet, the most stringent supervision of foodstuffs and the kitchen are essential. The mother as a rule tends to overclothe her child. Many European children in the tropics get too little exercise. Within moderation a European child can play at any hour of the day except during the heat of the afternoon. Singapore offers special advantages for the learning of swimming. The chief foes of the European child in the tropics are gastro-intestinal ailments, skin affections, and helminthic infections, and all these can be guarded against or cured. The paper, as a whole, is a most interesting one, and full of sound advice.

Infantile Cirrhosis.—This mysterious disease continues to attract attention, and is dealt with in our issue for March by M. A. K. Iyer. He stresses the frequent finding of syphilis in the parents; too much starchy and fatty foods as a possible factor; and the possible rôle of patent foods. Whilst most common among Brahmins and high caste Hindus, it is curiously absent among the Brahmins of Malabar.

OPHTHALMOLOGY.

Once again we are indebted to Lieut.-Col. R. E. Wright of Madras, for his review of the year, which is as follows:—

Sir Norman Walker's report deals with the teaching of ophthalmology in India in a highly complimentary manner. In this connection, it may be noted that an attempt to encourage the post-graduate study of this subject has been made in Madras, by the establishment of an examination in the teaching and practice of the Government Ophthalmic Hospital. It is based on the lines of the L. M. Rotunda, Dublin, and successful candidates are granted the certificate of L.O.

The subject of *cataract* extraction again looms large amongst contributions from workers in India.

Col. Smith published one of his most important recent articles on this subject. He traces the history of intracapsular extraction, crediting Col. McNamara, I.M.S., with its origin. To Smith, however, belongs the honour of having established and popularised the idea, so that at present it is employed by some surgeons all the world over, with variations for the most part from the Smith procedure, such as Stancelaneau's forceps extraction modified by Knapp, and phakoerisis developed by Barraquer. Smith regards all methods as inferior to his and believes that by his new technique he can insure even the hard lens tumbling with a degree of success "beyond his expectations."

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B. N. Bhaduri records phlyctenular conjunctivitis recurring with successive menstruations. The same author draws attention to a possible case of cataract due to kala-azar, but Col. Coppinger in a footnote evidently considers this ætiology doubtful.

Gopal Tambe describes an interesting case of symmetrical tumefaction of the lids in a child, the nature of which was not determined.

In his Annual Report of the Government Ophthalmic Hospital, Madras, Col. Wright discusses cataract work in some detail, dealing with such points as the prejudicial effects of blood, cortex, capsule, or organisms in the anterior chamber. Blocking of the main trunk of the facial nerve, employed there originally in 1921, has become a routine in troublesome patients. Ciliary ganglion blocking is for the most part reserved for painful eyes. Phakoerisis with special reference to Green's modification of Barraquer's technique, and some of the essentials of the problem capsolotomy *versus* intracapsular extraction, are dealt with. The author is inclined to favour phakoerisis in selected cases, while still maintaining a firm conviction in the undesirability of vitreous trauma. The bacteriology of iris tissue was the subject of a research undertaken with the aid of Mr. Theodore, under the auspices of the King Institute, Guindy. The problem is a very important one and those interested will find food for thought in the details published. The relation of glare to the frequency of cataract is touched on, hospital records unfortunately do not appear to be of statistical value in this problem. A simple method of dealing with destructive lesions of the lids as an aid to the general practitioner is described. Uuguentum hydrarg. perchloride, 0.5 per cent., is suggested as a treatment for trachoma of general applicability. Interesting clinical cases referred to in the report include myiasis of the degenerate cornea, bilateral lymphoblastoma of the orbit with leukæmia showing cell inclusions, uncommon orbital tumours, and congenital ankyloblepharon.

Major Duggan records his impressions of Green's visit to Bombay, and is favourably impressed with deep infiltration of the orbit as employed by him. (The conception, however, is not Green's, having been introduced in Elschnig's clinic in 1908 and utilised in many places including India since.)

G. J. Gnanadikam, writing from Keugelberg's clinic, Tirapatur, describes the preparation of patients for cataract operations by means of yellow oxide ointment. The method is important and finds considerable favour. Other details of Keugelberg's technique are worthy of attention. It may be noted that he uses the suture control of the superior rectus.

Major Cruickshank publishes an important analysis of work done in Holland's clinic at Shikarpur. From this careful survey may be obtained a comprehensive picture of cataract work in general and its evolution in particular directions, in this representative cataract centre of the North.

Col. Wright and Koman Nayar presented a corneal microscope study of a series of intracapsular extractions with Green's apparatus before the Oxford Congress, featuring in particular the behaviour of the vitreous body.

Major Dick and the writer spent some time at Barraquer's clinic and were privileged to observe his methods.

Possibly the most far-reaching event of the year is Noguchi's work on trachoma. He has isolated an organism from human trachoma cases which, from culture, produces a condition in chimpanzees (and *Macacus rhesus*), indistinguishable from human trachoma in its early stages. Direct transmission from man to monkey is impossible, but monkeys infected on one side transfer the disease to the sound eye. The writer, whilst on a visit to some of the leading clinics in the Eastern States of America, had the privilege of discussing this important research with Dr. Noguchi at the Rockefeller Institute, New York, and seeing his experimental monkeys and histo-pathological preparations. It is reasonable to hope that at last a decided advance has been made in the elucidation of this important disease, which has been a world-wide scourge of great economic importance for centuries.

In connection with ophthalmology, we may perhaps call the attention of those of our readers who do not know of them to the excellent series of special reviews of recent work in the subject, published from time to time by Lieut.-Col. H. Kirkpatrick, I.M.S. (retd.) in the *Tropical Diseases Bulletin*.

PHARMACOLOGY.

A very considerable number of papers have here to be considered, chiefly from Lieut.-Col. R. N. Chopra's department at the Calcutta School of Tropical Medicine, showing how constantly increasing is the work in that department and its value to Indian pharmacology.

Major (as he then was) Chopra presided over the Medical and Veterinary Research section of the Indian Science Congress in January of the year, and his presidential address on "Some aspects of therapeutics in India" was published in our issue for March. It is a most interesting and thoughtful review of the present status of therapeutics and pharmacology in India; and one which we would commend to the attention of our readers.

Antimony.—Major Chopra records the results of an investigation into the action of the organic compounds of antimony. The following are his conclusions.

(1) All the organic compounds of antimony produce a fall in the systemic blood pressure after intravenous injections. This fall is easily compensated for when small doses are injected but if large doses are given and specially if given rapidly, the fall is pronounced and lasting. The blood pressure soon regains its normal level unless very large doses have been injected.

(2) The fall in the systemic pressure is due partly to the lessened output of the left ventricle and partly to dilatation of the splanchnic vessels. The acidity of the solutions is not an important factor in producing the fall.

(3) The cardiometer shows that the heart is considerably dilated and both the force and the amplitude of the contractions are decreased. This weakening of the beats is also shown by the myocardiograph and in records of the contractions of the isolated heart.

(4) The pressure in the pulmonary artery and also in the inferior vena cava rises. With small doses, given slowly, the rise is small and is immediately compensated for. With larger doses, given rapidly, the pulmonary pressure increases 100 per cent. or more and persists at that level for some time. This rise is due to progressively increasing obstruction in the lungs which causes the right heart at first to do more work and then to dilate when the strain is beyond its power. At this time the systemic pressure has fallen and the venous pressure rises.

(5) The blood vessels of the intestines, liver and spleen dilate; the kidney shows slight contraction, and the limb also slightly decreases in volume.

(6) The increase in the size of the spleen and liver after injections is very remarkable; the rhythmic movements of the spleen are increased. The influx of a large amount of blood into these organs is probably an important factor in the curative effect of these compounds.

(7) The respiration is only slightly stimulated even with large doses of the tartrates, but with large doses of the organic compounds it stops immediately with the fall in blood pressure. Respiration becomes irregular, shallow and jerky and changes from the abdominal type to a thoracic type. When large doses are rapidly given both the heart and respiration may stop simultaneously.

(8) The circulatory changes in the pulmonary, systemic and venous systems and the changes in the circulation of the spleen, liver, etc., account for all the milder toxic symptoms such as faintness, feeling of constriction in the chest, cough, feeling of fulness in the region of spleen and liver, etc. The severe toxic symptoms such as dyspnœa, cyanosis, marked respiratory disturbances resembling "nitroid crises" are associated

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with extreme changes in the pulmonary pressure as well as contraction of the bronchi.

The effect of antimony salts on conception and pregnancy in experimental animals has been studied by Lieut.-Col. E. C. Hodgson, Dr. A. C. Vardon, I.M.D., and Subadar Zorawar Singh, I.M.D. They conclude that there is definite evidence that antimony salts cause damage to female animals which are receiving periodic injections, the damage being responsible for either failure of conception, abortion, or damage to the fœtus, and frequently in all three ways. The injury passes off very rapidly as soon as the antimony injections cease. There is no evidence that antimony injections have any effect in causing sterility in the male.

Cinchona derivatives.—Major T. A. Hughes and Mr. D. L. Shrivastava, M.SC., have studied the effect of quinine administration on the phosphorus metabolism in man. Their conclusions are as follows:—

The results show that quinine in anti-malarial doses in man causes a retention of phosphates. Considered in the light of previous work this fact is evidence of the interference of this drug with carbohydrate metabolism, and as quinine in the doses mentioned has been shown to cause a fall in the blood-sugar, one may venture to conclude that this interference takes the form of causing an increased output of insulin. The work of Brittin, who showed that stimulation of the right vagus in cats produced a fall in blood-sugar when the circulation, through the pancreas, was unaffected, and that of Clarke, who produced hypoglycæmia in rabbits by the injection of vagal stimulants, indicate that quinine produces its effect on the circulating glucose by acting as a stimulant of the parasympathetic system. While the fall in blood-sugar after administration of quinine can be prevented by previous ingestion of carbohydrates, as has been pointed out elsewhere, this does not prevent, but rather tends to augment the effect on the islet tissue. When, therefore, quinine is administrated in large doses over long periods, as is often done in the treatment of malaria, it is acting more or less continually as a stimulant of the pancreatic islets and as over-stimulation of this tissue is known to produce exhaustion it is not unlikely that in many cases quinine plays a rôle in the production of a diabetic condition.

Major Chopra and J. C. David have studied the pharmacological action of quinamine. This occurs in appreciable amounts in Indian cinchona bark, but has but little action on bacteria and protozoa. It does not affect the digestive ferments to any marked degree, but stimulates intestinal peristalsis, and on intravenous injection causes increase in the splenic volume. It has a weaker action on the circulation than the other alkaloids of cinchona bark; the respirations are slowed and there is slight but persistent dilatation of the bronchi. Its action on both the virgin and pregnant uterus, however, is exceedingly marked, and in a dilution of 1 : 500,000 it causes marked tonic contraction of that organ. It is possible that the oxytoxic action so often attributed to quinine is due to traces of quinamine in the drug. The anæsthetic action of quinamine on the cornea and in blocking impulses in nerve trunks is almost as marked as that of cocaine.

Alcohol.—Major Chopra deals with the toxicity of mature and immature genuine spirits and of imitation or factitious spirits on the Indian market. His conclusions are as follows:—

The data I have gathered from these experiments lead me to conclude that—

(1) Ethyl alcohol by itself is at least as toxic to cats as ethyl alcohol *plus* the essences used in preparation of the imitation or factitious spirits. These essences consumed in quantities largely in excess of those ever found in the potable imitation spirits produce little or no effect on the animal organism.

(2) The specimens of fully mature and immature genuine spirits and the imitation or factitious spirits showed about equal toxicity towards cats when given in moderately large doses, such as are usually consumed by man, and also in toxic doses. The organs which bear the main brunt are the gastro-intestinal tract, the liver and the kidneys (as in man) and the degree of injury was about equal in all cases.

(3) My investigations confirm the work of the previous workers that ethyl alcohol is mainly responsible for the toxic effects produced, the bye-products even when consumed in amounts far in excess of those present in the immature spirits have little or no effect on the animals' organism.

(4) The deleterious effects of the cheaper spirits are due to the tendency on the part of the consumer to ingest larger quantities of these liquors, partly, because of their low cost and partly because of their comparatively milder taste which is less satisfying to the palate. Larger quantities of ethyl alcohol are therefore consumed and the toxic effects are attributable to that rather than to the bye-products present as a result of the spirits being not fully matured. The imitation spirits are made from patent still-spirits which contain only minute traces of the bye-products and to which the term immature cannot be applied.

Dr. B. B. Brahmachari deals with the germicidal power of ethyl alcohol in spirits in a paper read at the Indian Science Congress. In India, country spirits are frequently diluted with water which is freely open to gross contamination, hence this question becomes important. The cholera vibrio does not stand 11.8 per cent. of alcohol and is killed within 24 hours by 7.8 per cent. of alcohol, equivalent to a strength of 86 per cent. under proof. The *Bacillus typhosus* is more resistant, but is killed at 80 per cent. under proof within 24 hours. To kill dysentery bacilli (Flexner type) a strength of 15·75 per cent. of alcohol, or 72·5 per cent. under proof is necessary. In general, it may be said that the strengths of country spirits issued are such that the amount of alcohol present will sterilise the solution of bacteria, but in Bihar and Orissa strengths of 80 and 85 per cent. under proof are official and these may harbour infectious organisms.

Indian Indigenous Drugs.—Here two papers call for remark. Major R. N. Chopra and Mr. N. R. Chatterjee, M.SC., deal with the pharmacological actions and therapeutic use of *babchi* (*Psoralia corylifolia*), the oil of which is much used in the treatment of leucoderma. Their conclusions are as follows:—

(1) The active principle of the seeds of *Psoralia corylifolia* (*babchi*) is an essential oil. A fixed oil and a resin occur in large quantities but these are not pharmacologically active substances. Traces of a substance of alkaloidal nature are also present.

(2) The essential oil has a powerful effect against the skin streptococci. It has a specific effect on the arterioles of the sub-capillary plexuses; these it dilates so that in this area plasma is increased. The skin becomes red, the melanoblasts are stimulated leading to pigment formation. This pigment is exuded and diffuses into the decolorised leucodermic patches.

(3) Local applications of the oleo-resinous extracts made from the seeds are beneficial in the treatment of cases of leucoderma of non-syphilitic origin. If affections of the gastro-intestinal tract such as *E. histolytica* infections, etc., are present, these should be treated at the same time.

In a special *Indian Medical Research Memoir* (No. 6) the Rev. Father J. F. Caius, and Dr. K. S. Mhaskar of the Haffkine Institute, Bombay, contribute a study of the well known Indian remedy for dysentery, *kurchi* or *Holarrhena antidysenterica*. They conclude the bark has a much more anti-dysenteric action than the seeds. Doses of up to 60 to 120 grains of the powdered bark may be administered daily with safety, but an alcoholic extract is better, since 55 per cent. of the powdered bark consists of inert substances. The anti-periodic property of the plant requires fuller investigation. It is neither anthelminthic, nor stimulant, nor astringent, nor styptic. It is a bitter which increases appetite and digestive power. Its anti-dysenteric value compares favourably with that of any of the drugs now in vogue. Its anti-diarrhœal properties are not dependent on any one chemical constituent, but seem to be associated with the entire seed or bark. Finally, "it affords a safe.

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cheap, reliable, and easily administered drug for the treatment of diarrhœic troubles." Will the big manufacturing chemical firms of India please take note? For here is an Indian remedy for diarrhœa and amœbiasis which appears to be efficient, easily administered, and far cheaper than emetine.

Drug Addiction.—Major Chopra and K. S. Grewal have made a special study of the opium habit in India, their enquiry having been conducted chiefly among the Sikh population of Calcutta. Their conclusions are as follows:—

(1) In this series of cases, the commonest cause of opium taking was the association with and example of other addicts. Disease came next as a cause.

(2) The majority (85 per cent.) of addicts started taking opium before 40 years of age.

(3) 59 per cent. took more than ten grains a day and 85 per cent. over 5 grains a day.

(4) The younger addicts showed a greater tendency towards taking larger doses than elderly persons.

(5) Those who acquired the habit later in life remained satisfied with comparatively small doses.

(6) The habit is easily acquired but difficult to break off.

(7) 65 per cent. of the addicts declare that the habit is harmful. They want to give it up but are afraid to do so because of the withdrawal symptoms.

(8) Opium addiction is rare amongst the women.

(9) The withdrawal symptoms are identical with those observed elsewhere.

HELMINTHOLOGY.

Dr. P. A. Maplestone, M.B., D.S.O., Ankylostomiasis Research Worker, Calcutta School of Tropical Medicine, kindly contributes the following review of the year.

Lieut.-Col. Sir Frank Connor drew attention to the large amount of morbidity due to filariasis in India, and he advocates an enquiry on the lines of a commission, as being more likely to produce valuable results than are the present scattered and independent investigations now being carried on.

Three cases of filariasis with fever and glandular enlargement were treated by C. M. Dalal, with some success, it is claimed. Two of the cases received a single injection of 0·6 gm. neosalvarsan, and the third case had two injections of the same drug. Subsequent observation showed that there was no return of fever, and that there was a steady improvement in the glandular condition.

Dr. Vishnu Korke reported the results of a filarial survey of Bihar and Orissa. He found filariasis fairly prevalent in this province, and the chief clinical signs are affection of the genitals. The predominant species of microfilaria was *Mf. bancrofti*, but some of the material examined shows certain departures from the usual morphological picture of this worm in stained material.

The helminthological survey of the whole of India conducted by Asa C. Chandler has been completed. This survey was very rapidly conducted and the total number of persons examined is a very small proportion of the total population. Consequently the conclusions arrived at cannot be regarded as more than approximate, and more detailed investigations would most likely lead to considerable local modification in certain districts. However, speaking generally, the results may be taken as a good bird's-eye view of the position. The general indications are: that with the exception of Northern Bengal, parts of Burma and Assam, Travancore, and the Southern coastal portion of Bombay, hookworm infection is not very heavy, and while not altogether negligible in the rest of India, it is not a morbidity factor of primary importance. In conjunction with the hookworm survey, records were kept of other helminthic infections, whose presence is revealed by the methods of diagnosis used. It was found that *Ascaris* and *Trichuris* infections ran fairly parallel, and that they are common where there is evidence of gross pollution of the water-supply. But they also occur with considerable frequency in places where water pollution is not a factor, notably the tea estates of Darjeeling, the Dooars, Sylhet, parts of Burma, and in the Wynaad District of Southern India. The reason for this did not become apparent, but it was found to be a rule of general application that those districts with a heavy rainfall were the ones in which *Ascaris* and *Trichuris* infections were high, whether there was evidence of gross water pollution or not. But in North-Western India, where there is no provision to prevent fæcal contamination of the tanks, these two infections were rare, and it is suggested that desiccation and direct sunlight, even for short periods, kills the eggs of these species. *Hymenolepis nana* infection is fairly common on the whole, but it is entirely absent from some parts of India and its distribution is quite different from that of the above two worms. Examination of the areas where it is frequent, however, shows a marked coincidence with the distribution of plague; this suggests the rodent origin of the infection and is advanced as epidemiological evidence of the identity of the dwarf tapeworms of man and rodents. This is supported by the fact that *H. nana* infections were commonest in those places where the people were in the habit of keeping cooked food from one day to the next, and were careless in covering it effectually, to prevent the access of rats. *Hymenolepis diminuta* which is essentially a rat parasite was found 23 times in approximately 10,000 examinations, and 22 of these cases were in districts where *H. nana* infections were over 3 per cent., thus lending further support to the view that rats are important reservoirs of worm parasites communicable to man. Eggs of a *Trichostrongylus sp.* were found on a good many occasions, but the distribution was very uneven; eggs of a Gnathostome were found on three occasions in stools that from other evidence were considered to be of human origin, and seven times eggs of an unknown nematode were encountered. Schistosome eggs of an unknown species were found twice in stools that had been collected from the ground. *Tænia saginata* was not found at all in Hindus and was rare in Mahomedans.

N. H. Fairley in two papers, records the results of experimental infections with *Schistosomum spindalis*. In the first paper he shows by post-mortem examinations at stated intervals of experimentally infected monkeys, that they are susceptible to infection, but that the cercariæ after undergoing partial development disappear from the host before reaching maturity, and that the complement fixation test which becomes positive shortly after infection at first rises in titre and then gradually disappears, indicating spontaneous cure. Similar experiments with goats resulted in the recovery of mature worms and eggs from various parts of the animals. The development of the complement fixation reaction in goats, developed at approximately the same rate as in monkeys, but it remained high until their death. This indicates that the serum reaction in monkeys is not evidence of the production of immunity, but that there is some inherent character in their tissues which is a true natural immunity. Human beings probably possess a similar nature immunity against this trematode, since human infection with *S. spindalis* is unknown, despite the fact that the washerwomen of Bombay work in tanks from which heavily infected molluscs have been taken. The second paper deals with the infection of two water buffaloes with cercariæ of *S. spindalis*. These animals were killed 81 and 94 days, respectively, after infection, and in both of them numerous living worms and eggs were found. The development of complement fixation did not rise as high as in the case of the goats and monkeys, but this is considered to be due to the smaller dose of cercariæ relative to the size of the animals. From the habits of the water buffalo it is considered that this animal is probably the true definitive host of *S. spindalis*.

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From the Haffkine Institute, Bombay, Colonel Mackie reports further on the work at that Institute on schistosomiasis, as follows:—

Dr. N. Hamilton Fairley and Dr. F. Jasudasen have continued their enquiry on schistosomiasis. Their work is not quite complete to draw conclusions, still it will be of interest to indicate the various problems which have engaged their attention. They have investigated the possibility of transmission of disease in animals by *Schistosoma spindalis* via the upper alimentary canal. Contrary to the case in human beings, they find that animals can be infected by this route. Then they have studied a number of problems in connection with the bilharzial antigen, e.g., whether it is the ether-soluble or the alcohol-soluble' constituent of dried bilharzial infected livers of *Planorbis exustus* which contains the antigenic factor; the effect of heat on this antigen, and the value of an alcoholic extract of an adult schistosome as an antigen. They have conducted experiments to determine whether the immunity developed by the monkey, *Macacus sinicus*, during a first attack is a complete immunity on the therapeutic side; they have tested the relative value of tartar emetic in solution in water and in serum. They have also tested the value of Neostam, or stibamine glucoside (provided by Burroughs Wellcome) in treatment of animal bilharziasis.

In addition to the papers noted on in Dr. Maplestone's review, there are a few others which perhaps call for remark. A. K. Mukerji published a table showing for 1925-26 the incidence of helminthic infections among patients in the Carmichæl Hospital for Tropical Diseases attached to the Calcutta School of Tropical Medicine. All stools are examined by Lane's direct centrifugal flotation method, and also by McVail's thick smear and levitation process. The results in this population are to show a general helminthic rate of infection almost double that for patients at the Calcutta Medical College, published a few months previously by D. M. Chatterji. Whilst hookworm infection is important, *Ascaris* infection is not of much less importance.

Hookworm.—A paper of importance to workers in India is that by Lieut.-Col. Clayton Lane, I.M.S. (retd.) in the *Transactions of the Royal Society of Tropical Medicine and Hygiene*, Vol. XX, p. 455. This is practically a summary of his former series of papers on the mass diagnosis of ankylostome infection, and constitutes a final defence of his technique of direct centrifugal flotation as *the* method for *mass* diagnosis; "individual exact diagnosis on a mass scale has been my unswerving aim over a period of many years," he writes. "It would seem that direct centrifugal flotation approaches it." This paper should be consulted in the original by those who have to carry out examinations for hookworm infection on a mass scale.

In our October issue, A. K. Mukerji dwells on the physical efficiency in persons infected with hookworm. This reports on an application of Schneider's cardio-vascular test for physical efficiency to Indian subjects infected with hookworm and to healthy Indian controls. The results for healthy persons compare favourably with Schneider's figures for America. In general, he concludes, hookworm infestation in this country—as studied in Bengal jails—is not sufficiently severe to cause definite loss of physical efficiency. This finding is of interest, for it clinches a vague similar clinical opinion to which many observers have been coming during recent years.

Dr. Milford Rice records the results of mass treatment for hookworm infections in tea gardens in Assam. His conclusions are as follows:—

(1) Mass treatments for hookworm disease should be given in February and March on tea estates in Assam.

(2) Most newly recruited coolies have hookworm infection when they arrive on tea estates from their respective countries and should be treated upon arrival.

(3) If cattle manure contains active hookworm eggs, heavy infections might be expected through coolies using it as plaster for walls and floors of their houses.

(4) Pigs and dogs certainly, and possibly cattle, by passing their stools in coolie lines after eating human fæces, are a means of reinfection.

(5) Carbon tetrachloride, given in 60-minim doses to adults (18 to 50 years of age) in one ounce of saturated magnesium sulphate solution and after a morning meal, is a safe drug to use in tea estate practice. It is also safe to use for children and the aged if given in proportionate doses.

(6) No precautions are necessary other than to warn patients that they are not to take alcohol or spirits for 24 hours before or after treatment and to treat no case with any liver complaint.

(7) Pregnant women can be given the same dose as other coolies.

(8) The number of infections can be materially reduced by such mass treatments.

(9) Heavy infections can be reduced to harmless ones by such mass treatments.

Ascaris infection in reality appears to be of more pathogenic importance in India than hookworm infection, though the infection is often devoid of symptoms, this is by no means always the case, and the symptoms caused may be severe and even fatal. Further, the infection is extremely common in India. Major J. H. C. Walker, R.A.M.C., records an infestation rate of no less than 85 per cent. in the garrison of Singapore, traced chiefly to the supply of uncooked vegetables from the local market gardens, managed chiefly by Chinese. The use of human fæces as garden manure is forbidden by law, but in practice this practice is very difficult to prevent. The fæces so used are generally stored for three weeks before use, and this gives the *Ascaris* ova time to mature and become infective. Clinical notes of severe cases of infestation follows.

Y. S. Row records a case of *Ascaris* infection with symptoms simulating cholera, completely cured by santonin administration. M. Barooa records two similar cases, where, however, near relatives of the patients were suffering from true cholera at the same time. B. N. Chakravartty gives details of a case of extremely severe abdominal colic accompanied by *Ascaris* infection, and cured by santonin and calomel administration. Finally, M. Barooa records a case where more than 500 worms were present, the patient had all the clinical signs and symptoms of acute intestinal obstruction, was operated on, and died.

It seems not unlikely that *Ascaris* infection is a more important problem in India than hookworm infection, and it would be interesting to get figures for general incidence of the infestation and reports as to its pathogenicity or otherwise.

In our issue for August, P. M. Bhachech records a personal experience of guinea worm infection. Two worms were discharged in 1908 with suppuration; a further worm without suppuration in 1912; and finally a third, very small worm, which first appeared in the eye and was finally discharged through the canthus of the eye in 1927. The patient had been in endemic infected districts, however, during most of his service.

ENTOMOLOGY.

Dr. C. Strickland has very kindly forwarded us the following review for the year.

The papers on medical entomology which have appeared during the year are here classified according to the branches of medicine to which they relate. I am indebted to Dr. Roy for his help in compiling these notes.

Ears, noses and throats.—Biswas and Strickland record and discuss a case of infestation of the naso-pharynx with a polychæte or marine worm in a person accustomed to bathe in the Ganges. The symptoms were of very severe coryza.

Seshachalam has notified a remarkable foreign body of the external ear passage, to wit a small live scorpion about one inch long.

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Klein recommends for the removal of ticks from the external ear passage the filling of it with Dioxygen, leaving it for 10 to 15 minutes and then removal of the dead parasite by syringing with warm water.

Beselin records the infestation of the ear passage with the tick *Ornithodorus megnini*. Loubser has made independent observations to the same effect.

Eyes.—Felt mentions a case from which young maggots of the species *Wohlfartia vigil* parasitic on the conjunctiva were removed.

Wright of Madras has described myiasis of the cornea which had showed dystrophic changes. The maggots were hatched out and proved to be flies of the family Phoridæ (*Apiochæta scalaris ferruginea*).

Mazza and Frias report the effects of the vesication of the lower eyelid by a hairy caterpillar.

Venoms, stings, intoxication, etc.—Cases of general toxic effects following the "bites" or "stings" of diverse creatures have been reported and may be given under:—

Bees.—d'Abreu analyses five cases from Lahore and remarks on the diversity of the symptoms produced.

Beetles.—Parlowsky and Stein discuss the toxic properties of the vesicant fluids of *Pœderus fuscipes*, the blister beetle (which produces spider-lick in India). They show that the toxin is mainly to be found in the insect's blood.

Centipedes.—Hase has reported on the venom of certain small European species, whose bite causes more serious local symptoms than constitutional.

Ticks.—Ross reports on experimentally induced tick-paralysis in dogs. Paralysis can only be effected by the adult of the species used, *Ixodes holocyclus*, though young ticks can produce other symptoms.

Spiders.—Bogen in California has described 15 cases of severe intoxication by species of the genus *Lathrodectus*, while Jackson in Queensland reports a fatal case. McKay makes the suggestion that these serious cases should be treated "on the same principles as snake bite." Korownikow gives another account of spider poisoning by a *Lathrodectus*, noting that no local symptoms are produced but very severe and rapid general intoxication. It should be noted that these spiders occur in India. They are small with a globular abdominal division usually marked on the dorsum with one or more brightly coloured spots.

Scorpions.—Milton Lang from the Central Provinces reports a case of scorpion bite. Symptoms appeared within 15 minutes and included urgent desire to micturate not to be satisfied, severe pains throughout the body, vomiting, cough with blood-stained expectoration, cyanosis, loss of radial pulse and cold sweats. Treatment as for collapse restored the patient.

Skins.—Dobronravov has described "a creeping eruption" which was traced to a single larva of a bot-fly living in the foot. Hase has noted the typical and intense erythema following centipede bite. Hoffman from the West Indies describes the irritant effects of *Loxa flavicollis* (a Pentatomid bug) when brought into contact with the skin. da Matta has reported an acute dermatitis followed by a vesicular eruption due to a hairy caterpillar *Megalopyge lenata*. Illingworth has also described a similar condition caused by the hairy moth caterpillar *Nygmia flava*.

D. N. Roy, analysing the local effects of mosquito bites has concluded that the diverticula of the gut are food reservoirs. He finds that an emulsion of the diverticula as well as of the salivary glands will produce erythema and a wheal when injected intracutaneously, the former being more severe. He could find no anticoagulant in these organs.

Pavlovsky and Stein have reported on the pathology of the skin lesions of the vesication produced by the blister beetle *Pœderus fuscipes* (spider-lick).

Affections of the intestinal tract.—Heymons has noted that an Annelid (*Lumbriculus lineatus*) commonly found in fresh water may live as a parasite in the human intestine.

Faggioli mentions a case of a child aged 15 months with a history of intestinal disturbance who passed the rat-tail larvæ of the hover fly (*Eristalis tenax*). Treatment by santonin and calomel cured the patient.

Bedford in South Africa found the larvæ of the stable fly *Stomoxys calcitrans* rather unusually causing intestinal disturbance.

Affections of the genito-urinary tract.—Mekie has described the infestation of the bladder by mites causing cystitis.

Mumford reports from England two cases of myiasis of the tract by *Fannia canicularis* and *Musca domestica* respectively.

PREVENTIVE MEDICINE.

Plague.—Fabian Hirst as a result of much detailed experimental work thinks that the spread of plague among rats depends primarily on *cheopis* though he admits that *astia* may occasionally transmit the infection.

Typhus, pseudo-typhus, etc.—Spencer shows that in Virginia pseudo-typhus follows the bite of a tick, probably *Amblyomma americanum*. In these cases there was a local lesion and Weil-Felix was negative.

Noguchi has found *Dermacentor andersoni* transmit Oroya fever to monkeys and has isolated *Bartonella bacilliformis* from the infected cases.

Stanley Hirst gives a list of 7 species of Gamasid mites which occur on rats and he also gives a key to the identification of the 7 blood-sucking genera. He considers the genera *Dermanyssus* and *Liponyssus* to be the most likely dangers to man in the transmission of infections.

MALARIA.

Anophelines.—Christophers, Sinton and Covell have prepared a key to the identification of the adult Anophelines of India, while Strickland and Chowdhury have done the same for the larvæ. Covell has described a new species *A. ramsayi*, while Strickland and Chowdhury's new species *A. pseudo-jamesi* may be the same.

Chalam has found *subpictus, stephensi* and *culicifacies* breeding freely in sea-water pools in Back Bay, Bombay; and the same author has shown that the eggs of the first two species cannot resist desiccation for more than 12 days.

In addition to those mentioned in Dr. Strickland's review, several other papers call for remark. Many or most of these have appeared in the *Indian Journal of Medical Research*—a journal which has now almost reached the stage at which it might be sub-divided into three journals, one dealing with medical entomology, a second with malaria and paludism, and a third with other subjects including kala-azar.

Mosquitoes.—The first place must undoubtedly be given to Mr. P. J. Barraud's revision of the culicine mosquitoes in India, a very fine and monumental work, parts xix to xxii of which have appeared in the *Indian Journal of Medical Research*. A second important publication of the year is Dr. C. Strickland's illustrated *Key to the Identification of the Anopheline Larvæ of India, Ceylon, and Malaya*, with a foreword by Sir Ronald Ross previously referred to.

An exceedingly important contribution to the whole question of the bionomics of mosquitoes of genus *Anopheles* is one by Dr. K. B. Williamson of Singapore in the *Malayan Medical Journal*. This line of work is so new, and so important that, although the paper refers to Malayan rather than Indian conditions, we feel that we cannot do better than quote Col. Alcock's review of it in the *Tropical Diseases Bulletin*.

"Although a good deal of the information contained in this valuable report is of only local interest," he writes, "it contains numerous items of general interest, particularly in its experimental investigation of the surmise first expressed by Sir Malcolm Watson that the

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fitness of a potential breeding-place for Anopheles is determined by the composition of the water." One of the most general conclusions is that "all observations point to the almost complete cessation of anopheline breeding [in growing rice fields] when the acidity of the water falls to pH 6, and a sharp decrease below pH 6·4," although it is emphasized that on one occasion larvae of rice-field species were found in abundance in a drain (between rice-fields) where the water varied from pH 5·3 to 5.6. Another general conclusion from comparisons between certain dissimilar waters sterile to Anopheles *in situ* and the same waters made fertile to Anopheles in the laboratory, is that the natural sterility of waters may be due to their deficiency in food-stuffs. These experiments were made by introducing small floating cages of bamboo and muslin into the natural waters that were free from Anopheles breeding, the cages containing some of them well-grown Anopheles larvæ and some of them Anopheles eggs, in measured numbers; the results of the observations are compared with the results of laboratory experiments where larvæ and eggs were placed in water from the same natural sources in some cases without food, in other cases with a suitable supply of food. The results of the ingenious experiments here described justify the conclusion—probably of general import, but at least for the particular waters examined and the particular species of Anopheles made use of for experiment—that the food-factor is the determining one.

Experiments and observations are recorded respecting the larvicidal powers of common aquatic (paddy-field) bugs and of common paddy-field fishes. Among bugs the Belostomidæ were found most efficient. Among fishes an Ophiocephalus, the species of which are not usually credited with eating anopheline larvæ, were voracious enough in the laboratory, though not equal to the well known Osphromenus.

The flora associated with areas in Perak where the amount of Anopheles breeding is known receives notice. The presence of a Utricularia (*U. flexuosa*) "appears to characterize either the limitation of anopheline species to *A. sinensis* and *barbirostris* or the complete, or nearly complete, absence of all anopheline breeding."

The larvicidal properties of roasted *amang*—a ferruginous residue from a local mine—are described as sufficient to justify its practical probation. Rubber oil is also noticed as an efficacious larvicide, either alone or as an adjuvant to other oils.

The statement is made that algæ form only a small portion of the food of Anopheles larvæ, the bulk of their food being "of an amorphous character and of obscure origin"; [but this generalization must depend on very much limited observations—perhaps on observations of larvæ from rice-fields at some particular time.]

A further series of papers with reference to mosquitoes published during the year are chiefly of technical interest, and may be referred to more briefly. Majors J. A. Sinton and G. Covell deal with the relationship of the morphology of the buccal cavity to the classification of anopheline mosquitoes. B. S. Chalam deals with the relationship of the blood meal of the female *Anopheles* and of other factors to the fertilisation of its ova, with the resistance of *Anopheles* ova to desiccation, showing that the ova of *A. subpictus* and *A. stephensi* are still viable after desiccation for 12 days. Dr. Strickland deals with hypomelanism in an anopheline, apparently *A. vagus* with unusual markings.

The history of *Anopheles ramsayi* (*vel. pseudo-jamesi*) is a very difficult subject. This new species of *Anopheles* was first discovered, as far as we can make out, in Assam by Dr. G. C. Ramsay, who sent his material for study to Major Covell at the Central Malaria Bureau, Delhi. Major Covell's full and very detailed report of this new species was published in the *Indian Journal of Medical Research* for April, 1927, p. 1019. (The date of issue of this number from the press, we are informed by the publishers was the 17th May, 1927.) In the meantime Dr. Strickland had discovered what is apparently the same new species in Bengal, and his and Dr. Chowdhury's (incomplete) description of the new species was published in the *Indian Medical Gazette* for May, 1927, p. 240, the editors of this journal being at the time in complete ignorance of Dr. Ramsay's and Major Covell's work on what is apparently the same species. (The May 1927 issue of the *Indian Medical Gazette*, we are informed by the publishers, was published on the 10th May, 1927.) Which name therefore takes priority, we must leave it to the experts to decide. Subsequently this new species has been shown to be a carrier of malaria, though perhaps not a very important carrier. A paper dealing with the same species was published in the *Indian Journal of Medical Research* by Mr. I. M. Puri, M SC., PH.D., F.E.S., in the October issue. He concludes that *A. ramsayi* and *A. pseudo-jamesi* are one and the same new species, and that the larval characters of the two are identical.

Sandflies have continued to attract attention during the year, especially now that they are known to be of importance with reference to the transmission of *Leishmania* infections. Major J. A. Sinton continues his studies of Indian sandflies in the April and July issues of the *Indian Journal of Medical Research;* he gives a new description of *Phlebotomus malbaricus;* further records of the geographical distribution of different species; "miscellaneous notes" which include some very interesting points with reference to the leishmania transmission problem; discusses the value of the female genitalia in the identification of species; also the morphology of the buccal cavity in different species; and describes a new species caught in Lahore, *Phlebotomus christophersi.* Workers on *Leishmania* infections will be under a very great debt of gratitude to Major Sinton for the tremendous amount of valuable work which he has put into the clearing up and extension of our knowledge of these insects and for his notes with regard to the classification and identification of species; it is a field which he has made particularly his own. His demonstration of the chief Indian species at a meeting of the Royal Society of Tropical Medicine and Hygiene will further help to broadcast knowledge with regard to the genus in general.

Lieut.-Col. T. C. McCombie Young discusses the sandflies of Bombay city, on which he has been working. Three species are present: *P. papatasi, P. argentipes,* and *P. minutus*—together with its variety *niger.* The presence of the first named species is curious in view of the freedom of Bombay from endemic kala-azar, but the author is by no means satisfied that conditions in Bombay city are unfavourable for the spread of the disease; it may still appear there. Together with Capt. B. S. Chalam, he describes two new species from Bombay, *P. chalami* and *P. colabænsis.*

Miscellaneous.—A. B. de Castro in our issue for May records notes on four cases of bee sting—an article with perhaps nothing very new in it, but of interest from its clinical descriptions. Mr. Barraud has published a note on rat fleas collected in Assam. A curious feature of this collection of 213 Assam fleas is the very high prevalence of *Xenopsylla cheopis;* every single rat flea from Shillong with one exception—i.e., 61 out of 62—were *X. cheopis* and not *X. astia;* yet plague is entirely absent from Assam. A most extraordinary case, literally one of "sweating blood," is described by Lieut.-Col. R. Kelsall, in our issue for October; the patient, a Mahomedan lady in Rangoon, was accustomed to keep chickens in intimate contact with her and to carry them in her clothing at her breast. The fowl fleas, *Echidnophaga gallinacea,* had passed from the chickens to her skin, had bitten her, and caused the tiny petechial lesions on her chest.

In the treatment of myiasis, an affection which only too frequently comes to infect ulcers, nasal sores, etc., in India, M. M. Dave advises the local application after cleansing, on a cotton-wool plug of a solution of one drachm each of chloroform, carbolic acid, creasote, and oleum terebinthinæ. Cases are especially frequent during the rainy season.

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MEDICAL PROTOZOOLOGY.

An event of the year, perhaps, is the publication of Knowles' *Introduction to Medical Protozoology* (actually published in December, 1927, although labelled 1928 on the title page by the publishers). Whilst this book is intended primarily as a textbook for students at the Calcutta School of Tropical Medicine, the author hopes that the book will have a much wider value and that it will be of value to laboratory workers throughout the tropics, and especially to the laboratory worker who is isolated and out of touch with the large libraries. It has been reviewed in our columns for March 1928 by Colonel Mackie. The book must stand or fall by its own merits; it is for others to judge whether it is of any use or none.

Major H. E. Shortt publishes a note on cytoplasmic counter-staining in protozoological technique and recommends that, after staining by, e.g., Heidenhain's iron-hæmatoxylin method, the slide should be passed up through the graded alcohols to absolute alcohol, then immersed for a few seconds in light green (not S. F.), or brilliant green dissolved in a carbol-xylol mixture. The reviewer has tried this method and finds it of great value in giving contrast to the staining.

Major Shortt with C. S. Swaminath describes the life history of *Monocystis mackiei n.sp.* parasitic in the sandfly *Phlebotomus argentipes*. This is a new natural gregarine parasite of sandflies, of importance to workers with this genus of insect in connection with the transmission of *Leishmania* infections. The paper is illustrated with a magnificent series of photomicrographs, the originals of which were shown at the F. E. A. T. M. Congress in Calcutta in December, and which aroused the enthusiasm of many of our foreign visitors.

A. Vasudevan in the *Indian Journal of Medical Research* for July describes a most interesting case of *Sarcocystis* infection of man. The pectoral muscles were affected and the infection had given rise to an irregular ulcer about 2¼ by 1½ inches in diameter on the front of the chest. The memoir is illustrated by excellent coloured drawings of the lesions and photomicrographs.

Assistant Surgeon B. M. Das Gupta, describes a *Trichomonas* found in the gut of a non-poisonous colubrine snake (*Ablabes calamaria*); the parasite was readily cultured in Row's hæmoglobin saline medium and appears to differ from the previously described trichomonads of snakes in possessing four, instead of three, anterior flagella.

M. A. Narayan Rao has a valuable memoir on *Piroplasma gibsoni*. First described as a natural piroplasm of jackals, he now claims that it may also infect dogs, either naturally or experimentally. A detailed account of its life-history in the vertebrate host is given, together with photomicrographs, and schizogony forms are described from the spleen. The infection is more acute in type in the dog than in the jackal.

TROPICAL DERMATOLOGY.

A special feature of the year has been the series of papers contributed from Col. Acton's skin clinic at the Calcutta School of Tropical Medicine. These have been twofold in character; a series of clinical papers on the more important and common skin diseases of the tropics contributed to this journal, and a second series on the rarer types of tropical skin diseases contributed to the *Indian Journal of Medical Research*. It is hoped that on the conclusion of these series of publications Colonel Acton will be in a position to publish two books; a textbook on the commoner skin diseases of the tropics for the use of the general practitioner in India and the tropics; and a large atlas of tropical skin diseases for the more advanced worker. The colour plates for the latter, thanks to the invaluable work of Mr. H. M. Roy—Colonel Acton's special artist at the School—are already available, and constitute what is almost certainly an absolutely unique collection. The number of patients seen in this clinic has increased in seven years from 300 a year to over 3,500 a year.

Of the more general and popular papers, the first place must be given to the paper in our issue for August, 1927, by Lieut.-Col. H. W. Acton and C. McGuire on *Tinea cruris* infection. This is summarised as follows in the *Tropical Diseases' Bulletin*.

A well illustrated communication containing a useful detailed account of the disease as seen in India. Difficulty in diagnosis would seem to depend upon the frequent secondary pyogenic infection and the trouble involved in the detection of the fungus, preparations in 40 per cent. potash often requiring 24 hours' clearing for its definition. Infection occurs where the epidermis is thinnest, especially the cleft between the 4th and 5th toes. The conditions necessary for infection relate to moisture, warmth and friction. Children do not usually suffer. The nails of the fingers are more commonly affected than those of the toes, probably as a result of scratching. "*Tinea cruris* never extends above the neck on to the face although it may attack any other part of the body." A secondary streptococcal infection is the commonest complication. This may occasionally lead to a cellulitis or sometimes to a generalized condition with the appearance of an exfoliative dermatitis. These cases are frequently a mixture of streptococcal infection and arsenical dermatitis following treatment for supposed syphilis. Secondary staphylococcal infection is frequent, while among Indians secondary contamination with *B. tuberculosis* may give rise to warty lesions.

In describing the cultural characterstics of the Epidermophyton, it is asserted that the colour variations of the cultures are due to substances in the media and not to varieties of species. Treatment in the acute stages with secondary infection and bullous or vesicular lesions consists in the frequent application of calamine lotion (allowed to evaporate) during the day and a 1-2 per cent. mercurial ointment at night. For those cases showing a marked staphylococcal infection acriflavine solution 1 : 1000 is recommended. As soon as the lesions are dry, Whitfield's ointment is advised. In mango toe, with great thickening of the skin in the interdigital clefts, the affected area may be painted with Resorcin 1 drachm in Tr. Benzoin Co. 1 oz. This is to be applied at night, but requires careful observation and control. Chronic cases, which do not react to ointments, etc., are benefited by X-rays, both filtered and unfiltered, frequently in fractional doses. To prevent infection or reinfection after cure a sulphur camphor dusting powder is recommended for application to the feet and groin on alternate days with a simple absorbent powder, for the purpose of keeping these regions dry.

A second paper from the same clinic is the one by Lieut.-Col. Acton and G. Panja in our issue for November on seborrhœic dermatitis. This condition is due to infection with the *Malassezia ovale*, or "bottle bacillus of Unna." Three types are recognised: pityriasis capitis, which starts on the scalp and spreads to the body; pityriasis versicolor, which starts on the chest and spreads upwards to the neck and face; and pityriasis flava, which starts on the face and neck and extends down to the chest. Secondary streptococcal infection of the lesions may lead to an acute eczematous condition. The invasion of the skin is predisposed to by overactivity of the sebaceous glands. The invasion may extend to the face (comedo and acne) or in children to the body (flannel rash). In adult life the hair follicles of the scalp may be invaded, causing alopecia (baldness). In infancy the most characteristic lesion is miliary sebaceous acne; at puberty acne and kerosis, in which latter condition the skin is greasy and thickened with widely patent mouths of the sebaceous glands; in adult life infections of the body are common; and later in life baldness and seborrhœic warts. The acne bacillus is not the true cause of acne, but a secondary invader. The authors have been the first to successfully cultivate *Malassezia ovale* in vitro; washed scales from the dandruff areas are placed on the upper part of a tube of Petroff's glycerinated egg medium, and here, as the two conditions essential for the growth of the fungus are oiliness and dryness, the mycelium

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grows on the surface of the medium. Subcultures are more easily obtained than primary ones. The chief difficulty in diagnosis is the secondary infections, and it is often not realised that these cases are due primarily to infection with a fungus, and that unless this underlying fungus infection is dealt with the disease will recur.

By way of treatment, that of the scalp must be continuous. In young children the greasy scales should be softened with warm olive oil overnight, a ½ per cent. mercury oleate being a good application. In the morning the oily application should be washed out with soap and water and a resorcin lotion applied. In impetigo an ointment with 5 to 10 grains of hydrarg. ammoniata to the oz. is useful. For eczema rubra on the body calamine lotion should be applied until the acute inflammation subsides, followed afterwards by resorcin ointment, 5 to 15 grains to the oz. In pityriasis capitis of later life, with baldness coming on, a soap spirit lotion should be well rubbed into the scalp each night and then thoroughly removed with hot water and soap. The application of an ointment at night containing 10 to 30 grains each of sulphur and camphor to the oz. is helpful, the ointment being washed out again in the morning, or a sulphur lotion applied. Resorcin is the next best remedy to sulphur, and cresol and hydrarg. perchloride may be used in the form of a lotion. In cases of acne the blackheads should be expressed, a sulphur-camphor lotion used at night, and a bland face powder during the day. Boils should *not* be fomented, as this tends to produce fresh crops of them; an evaporating or calamine lotion is better. Many boils become spontaneously absorbed if left alone; but if they mature incision should be made with a very fine knife such as a cataract knife, the contents thoroughly expressed, and the point touched with tincture of iodine. For seborrhœa of the body resorcin, an ointment containing from 10 to 30 grains, at night, with a dusting powder containing sulphur during the daytime is best. Starches and fats must be cut down in the diet, and some cases may require X-ray exposures.

Col. Acton and Dr. L. E. Napier deal with post-kala-azar dermal leishmaniasis, the "dermal leishmanoid" of Brahmachari, giving a report based on 44 cases seen. In almost all cases this follows after cure of kala-azar, but occasionally occurs in a patient who lives in a kala-azar area, but has not had kala-azar. The parasite is almost certainly *Leishmania donovani*, and corresponds in all respects to the parasite of kala-azar. The condition begins with the appearance, especially on the face and extensor surfaces of the forearms of very tiny leucodermic spots, which may later appear all over the body. At each of these spots a tiny granulomatous nodule next develops, until finally the clinical appearance of the patient may closely simulate nodular leprosy; in some cases the granulomatous lesions are localised but large, and may infiltrate mucous membranes, the condition closely simulating xanthoma tuberosum. Leishmania can usually be readily demonstrated in films from the nodules; or in the early leucodermic stage by culture. The patient is in robust health and has no visceral leishmania infection. The tendency is apparently towards spontaneous cure after a number of years, and the best line of treatment is injections of pentavalent antimony salts.

In the *Indian Journal of Medical Research*, Col. Acton deals with porokeratosis, giving an account of eight cases seen. This rare disease is a form of hyperkeratosis. It is apt to occur on the hands, feet, and arms. The lesion is a raised one resembling a corn, which as it grows presents an irregular raised wall surrounding an atrophic depressed centre. A familial tendency and a lowered basal metabolic rate are present. Porokeratosis in fact is a localised keratosis which falls into the group of skin diseases—xeroderma, scleroderma, follicularis, morphœa, etc.—which are associated with hypofunction of the thyroid. The most successful line of treatment is to put the patient to bed, give him an intensive course of desiccated thyroid extract—2 grains twice a day or so, and have the pulse counted every four hours. Sufficient thyroid is given to keep the pulse rate at from 90 to 100 per minute. Within a few days very marked improvement is noted, and usually cure results within a fortnight.

A further splendidly illustrated paper by Col. Acton is one on sarcoids. The name sarcoid is unfortunate, as these vascular tumours have nothing to do with sarcoma; they are angiomatous growths which are innocent in character. There are four types: (*a*) small superficial venous angiomata—the "tach de Morgan"; (*b*) nodular types which are due to angioma formation in the sub-capillary plexuses of the skin. These often form small tumours which may be the size of a walnut and bleed readily. More than 20 such cases have been seen in persons convalescent from epidemic dropsy. Occasionally, instead of this angiomatous change being localised, it is diffuse and produces dark red extensive plaques which may occur on the back of the hands, the face, or the thigh; (*c*) the subcutaneous sarcoid, where the angiomatous lesions are situated more deeply in the subcutaneous tissue, and where diagnosis may only be possible by excision and section cutting; and finally, (*d*) sarcoids of the extremities simulating erythema induratum. Sarcoids are acquired as the result of the irritation of vessels in the different skin layers from toxins absorbed from the gut, which cause increased permeability of the vessel walls, œdema, and angiomatous overgrowth. Diagnosis depends on being familiar with the condition. The localised lesions are best treated by carbon dioxide snow, but the septic focus should always be looked for and treated.

On other interesting "skin" cases, we may mention M. Umar's interesting and very extensive case of dermatolysis in our April issue; D. J. Asana's case of von Recklinghausen's disease, with its admirable photographs, in our November issue; and Dr. Burke's interesting case of giant urticaria with marked periodicity in the symptoms in our February issue.

BIOCHEMISTRY.

Several of the papers already commented on might perhaps have been considered rather in this section. Of strictly biochemical papers, Dr. J. P. Bose deals with the chemistry of the blood in normal healthy Indians and its variations in disease in our issue for July. A table is given showing the minimum, maximum, and average values of the different constituents in health, and there is a useful discussion on the variations present in the different elements in different diseases. This paper is in itself so much of a summary that an abstract of it is impossible.

Major C. H. H. Harold, O.B.E., R.A.M.C., deals with the eu- and pseudo-globulins, with special reference to the Wassermann test (*R. A. M. C. Journal*, February, p. 92). From the Haffkine Institute, Parel, Colonel Mackie reports that Major Sokhey has been studying the normal basal metabolic rate for Indians, using Collin's modification of Tissot's gasometer. The 25 subjects studied so far show an average rate of 15 per cent. lower than the accepted rate for Europeans. Work on these lines is proceeding.

MEDICO-LEGAL.

The most interesting paper of the year is Major J. C. De's medico-legal study of the Calcutta riots of 1926; an article which has aroused a great deal of interest, and which was reprinted verbatim by the *Statesman*. The different types of injuries concerned in different systems of the body are well described, and any civil surgeon who has to give evidence with regard to injury cases in the courts would do well to study the article closely, for its medico-legal lessons are important. In one case, for example, the statement of witnesses that a European police sergeant had shot a rioter with his revolver was disproved by the finding of buckshot in the wound; the truth was that the rioter was attacking the police sergeant with a spear when he was shot by a police constable armed with a shot-gun. In a second instance an exceedingly trivial wound—to all appearance a stab wound behind the mastoid process—had

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caused fatal hæmorrhage from the vertebral artery into the ventricles of the brain, the occipito-atlantoid ligament having also been wounded. A third curious instance cited is one in which a passing taxi driver jumped off his taxi, cut the throat of a victim who was already probably dead from *lathi* injuries to the skull, remounted his taxi and drove off. This story, as related by witnesses, was confirmed by the exceedingly slight extent of the bleeding from the wound in the neck. If the riots of 1926 in Calcutta have done nothing else, they have added considerably to our knowledge of the types of injury to be expected in such circumstances.

The question of counterfeit drugs was dealt with in our editorial for September. The position in India is exceedingly difficult. As the law at present stands, apparently, reputable firms have no remedy against pirates other than to sue them in court—a lengthy and expensive business. Apparently anyone can copy a registered label—or, for that matter, take the label of a well-recognised firm off a used-up bottle of their products and paste it on to a bottle of any rubbish of his own composition and sell the product as that of the first class firm concerned. The police apparently have no power of search and seizure, such as exists in Great Britain and the United States. From every point of view an all-India Food and Drugs Act seems to be called for, but the difficulties of enforcing its provisions will be obvious.

An interesting case of poisoning by the seeds of the yellow oleander (*Cerebra thevetia*) is recorded in our issue for August by B. M. Roy. There was marked heart-block and coma, and the patient's life was apparently saved by the prompt and vigorous measures instituted, especially the washing out of the stomach.

LABORATORY METHODS, SERA, VACCINES, TECHNIQUE.

A useful article is that by Lieut. J. F. Osman Bodman in our December number on the more easily observed pathological changes in the cerebrospinal fluid, and their clinical interpretations. This article it is impossible to summarise, but it shows how much information can be derived from a simple naked eye observation of the fluid and from a simple opacity test for its total protein content. It should be consulted in the original.

Capt. S. D. S. Greval deals with the effect of excess of the hæmolytic amboceptor on the minimum hæmolytic dose of complement in the Wassermann reaction. He concludes that a hæmolytic system of guinea-pig complement, sheep red cells, and antisheep hæmolytic amboceptor leaves nothing to be desired. An excess of hæmolytic amboceptor, using 10 M.H.D. instead of 5 M.H.D., does not affect the M.H.D. of the complement. A false negative reaction does not result from an excess of the hæmolytic amboceptor.

Lieut.-Col. J. Cunningham, describes a simple method of handling squirrels and other small animals for bleeding and other purposes. A box, forceps, and muzzle are described, by the use of which squirrels or other small biting animals can be held for bleeding and other purposes with perfect safety to the attendant. The squirrel, as he points out, is a most useful animal for laboratory purposes. It is hardy, lives well in captivity, is easily fed, and is not expensive. (*Indian Journal of Medical Research*, July, p. 81).

Assistant Surgeon J. H. Theodore, I.M.D., describes a special enrichment medium for the growth of the gonococcus, using a serum agar made with human placental broth. The growths obtained are very luxuriant, whilst human placenta is usually readily obtained by medical men, and the method should be more widely known (*I. M. G.*, August, p. 444).

Capt. C. P. V. Shunker advocates counter-staining with picric acid in the examination of sputum for tubercle bacilli. The film is stained in the usual way with hot carbol-fushin, washed, decolourised with 25 per cent. sulphuric acid, treated with absolute alcohol, again washed, and then counter-stained with a half saturated watery solution of picric acid for 5 to 10 minutes. The red tubercle bacilli show up better against a yellow background than against the usual blue background obtained by counter-staining with methylene blue. (*I. M. G.*, February, p. 84).

From the Central Research Institute, Kasauli, Capt. K. R. K. Iyengar sends us the following interesting résumé of the work by Lieut.-Col. W. F. Harvey, C.I.E., I.M.S. (retd.) and himself on the development, duration, and restoration of immunity in vaccine therapy.

Much of the literature on the subject has centred around determinations of agglutinin increase or decrease. Our observations therefore of agglutinin production and protection simultaneously evaluated will be of considerable interest in this connection.

The organism which we worked with, as in most of our work on immunity problems (*Indian Journal of Medical Research*, 1921–23), is *B. avisepticus*, chosen because of its pathogenicity to pigeons. This organism has the additional advantage that, as a member of the hæmorrhagic septicæmic group of organisms it is related to *B. pestis*. The pigeon has been chosen as the test animal because of its relative cheapness and therefore availability in numbers which would carry weight not only experimentally but also statistically. We have preferred to rely on experiment based not so much on minimum lethal dose but on what we call a "minimum lethal picture" in which the minimum lethal dose and the multiples of the dose are all represented. In every testing experiment done, there was introduced a complete series of control animals, which ensured that we had always at hand the equivalent of what, statistically, could be described as an alternate series for comparison.

In this experiment 600 pigeons received inoculation and then served at stated intervals for the test of protection. When the duration of protection had come to an end, the pigeons left over were used for the restoration and duration of immunity after re-inoculation. The usual method of re-immunization is to repeat the original immunizing dose. In the present investigation we have sought to determine the conditions under which immunity can be completely restored especially in regard to size of re-immunizing dose. This is a most important matter, for it is well known how difficult it is to get large bodies of men voluntarily to undergo prophylactic inoculation and how very much more difficult it is to get them to repeat their previous experience by consenting to re-inoculation. We experimented with a series of doses for re-immunization—the original optimum minimal prophylactic dose and doses which were ¼, ⅛, 1|16 and 1|32 of this.

Conclusions.

(1) Single doses of vaccine can produce immunity, but not of so high degree as two or three doses.

(2) Some immunity can be obtained within a week of commencement of inoculation.

(3) Full immunity is attained within three weeks of the commencement of inoculation.

(4) The duration of immunity after inoculation is shorter than is generally appreciated.

(5) The agglutination titre curve was not parallel to the immunity or protection curve. There is a marked diminution of agglutinins while protection is still maintained at its maximum.

(6) Re-immunization may be carried out with doses which are smaller than even the smallest dose originally required to confer maximum immunity. Animals receiving ¼th and ⅛th of the original dose showed as high a degree of immunity as those receiving the full dose. The immunity so conferred, is as great and lasts as long as, but no longer than, the original immunity.

SERVICE NOTES.

Once again we are indebted to Col. J. K. S. Fleming, Deputy-Director-General, I.M.S., for a review of the year. The following is his report.

(1) It is understood that the Secretary of State's sanction to the reconstitution of the Indian Medical

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Service referred to in the Service Notes of 1925 and 1926, has been received, and the question of giving effect to the proposals is now receiving the attention of the Government of India.

(2) Reference paragraph 2 of the Service Notes forwarded in December, 1926, regarding passage concessions to Indian Officers of the Indian Medical Service, the Secretary of State has decided that all officers appointed in India to the Indian Medical Service are to be deputed to England to take the Junior Royal Army Medical Corps Course within the first year of their service. All officers of the Indian Medical Service including those of Asiatic domicile will also be required before promotion to the rank of Major, and between the 7th and 10th year of their service, to complete the Senior Officers' Course at the Royal Army Medical College, Millbank. Attendance at both these courses will be regarded as duty. The concessions that have been sanctioned under the above-mentioned scheme are:—

(*a*) Free return passage when taking the Junior Royal Army Medical Corps Course in the case of all Indian Medical Service Officers appointed in India.

(*b*) Free return passage and full pay when taking the Senior Officers' Course at the Royal Army Medical College, Millbank, in the case of all Indian Medical Service Officers, whether of Asiatic or non-Asiatic domicile; also travelling allowance from their headquarters to the port of Embarkation and *vice versa*.

(*c*) Free passage to India for Indian Indian Medical Service Officers granted study leave on conclusion of the Senior Officers' Course.

(*d*) Free return passage for Indian Indian Medical Service Officers granted study leave, who are ineligible for the Senior Officers' Course or who are refused study leave on the conclusion of that course.

Pending the introduction of the above scheme in full the Government of India in Army Instruction India B. 136 of 1927 have decided that an officer of the Indian Medical Service of Asiatic domicile, whether in Military or Civil employ, who has already attained the rank of Major or who is likely to attain that rank before the full scheme is brought into force will be allowed one free return passage to the United Kingdom when granted study leave.

(3) The 7th Congress of the Far Eastern Association of Tropical Medicine was held in Calcutta, between the 5th and 12th December, 1927.

(4) The question of establishing a General Medical Council in India is, at present, receiving the attention of the Government of India and pending the formation of this Council a proposal of appointing a Commissioner of Medical Education, is it is understood, under consideration.

(5) Under Army Instruction India No. B. 155 dated 12th July, 1927, revised rates of furlough pay in India for Indian Medical Service Officers holding military administrative appointments were sanctioned:—

"With effect from the 1st July, 1927, officers of the Indian Medical Service holding military administrative appointments, while on leave in India, other than privilege leave, will receive pay at the following monthly rates, to which full overseas pay will be added if admissible."

	Rs.
Director of Medical Services in India ..	2,400
Deputy Directors of Medical Services, Commands	2,060
Deputy Director of Medical Services, Army Headquarters	1,875
Directors, Army Headquarters. Assistant Directors of Medical Services, Districts and Independent Brigades .. Consulting Dermatologist of over 25 years service.	1,800
Consulting Dermatologist of 25 years or less service	1,650
Assistant Director Medical Services, Army Headquarters	1,610

(6) Under Army Instruction India No. B. 159, dated the 19th July, 1927, the tenure of administrative appointments assigned to Colonels and Major-Generals of the Indian Medical Service will count from the date of promotion to such rank but the pay of such appointments will not be admitted until the duties have been actually assumed. When an officer on leave in the United Kingdom is promoted he must return at once to duty unless granted special permission to the contrary.

The above change is to be applied only to such officers of the Indian Medical Service as are promoted to administrative rank on or after the date of this instruction.

(7) In accordance with the Royal Warrant dated 10th June, 1927, General Officers are to be placed on the Retired List at the age of 60 instead of as heretofore at the age of 57. The provision for a General Officer, affected by age limit, to continue in employment for not more than one year in any special case has been cancelled.

(8) Under Army Instruction India No. B. 135, dated the 14th June, 1927, an officer of the Indian Medical Service commissioned on or after 1st July, 1926, who has held a resident appointment of not less than one year in a recognised civil hospital in the United Kingdom or in India may be granted an antedate not exceeding one year in respect of the period spent in such an appointment provided that the interval between the termination of the hospital appointment and the date of entry into the service shall not ordinarily exceed six months. This antedate will count as commissioned service for the purpose of increments of pay, promotion, retirement and retired pay, but not for gratuity.

(9) The Government of India have in consultation with the Secretary of State considered the question of requiring Indian Medical Service Officers retiring on gratuity to join a reserve. In accordance with the proposals which have been sanctioned officers appointed to the Indian Medical Service on any special terms similar to those of July 1926, will, if they retire on gratuity after 12 years service or over, be liable to recall to military duty in an emergency up to the age of 55. The question of enforcing the liability to recall in the case of officers retiring on gratuity after less than 12 years' service has been reserved for consideration when the effect on recruitment of the impending reorganization of the Indian Medical Service is known.

(10) The Government of India have accepted the position that an administrative medical officer in civil employ should not be compelled to retire on the completion of his tenure of appointment if within the age limit, and that he can avail himself of any leave admissible to him up to the date on which he becomes superannuated. During such leave he will no longer retain a lien on his administrative post but on some other post such as a civil surgeoncy in the province in which he was employed prior to his appointment to an administrative post and the officiating incumbent will be permanently appointed from date of vacancy.

(11) Since the beginning of 1927, twenty European officers have been admitted into the Service in accordance with the Special Recruitment terms of 1926 which were detailed in the Service notes forwarded in December, 1926. These terms may, however, be repeated again:—

A gratuity of £1,000 after six years service or £2,500 after twelve years service together with free return passage to any officer so appointed who no longer desires to remain in the Service subject to 12 months notice of his intention being given.

Two Indian candidates were appointed early in the year. A Selection Board was held in Simla in August of this year for the recruitment of further Indian candidates to the Service. Twenty candidates were selected and recommended to the Secretary of State for permanent commissions and sanction to the appointment of the first eight on the list has just been received. The Secretary of State's orders regarding the remaining 12 candidates selected are awaited.

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(12) The present strength of the Indian Medical Service is:—

Permanent officers	635
Europeans	469
Indians	166
Temporary officers	123
Europeans	1
Indians	122

CASUALTIES.

DIED.

Lieut.-Col. H. W. Pierpoint, F.R.C.S.
" E. T. Harris, D.S.O.
Major S. D. Billimoria.
Captain G. Kumar.

RETIRED.

Major-General R. Heard, C.I.E., K.H.S.
Colonel C. H. Bensley, C.I.E., K.H.S.
" E. L. Perry, D.S.O.
" A. N. Fleming, D.S.O., K.H.S.
" A. Fenton.
Lieut.-Col. W. D. H. Stevenson, C.I.E.
" C. A. Gourlay, D.S.O.
" E. D. W. Greig, C.I.E.
" J. G. P. Murray.
" E. O. Thurston, M.B., F.R.C.S.
" T. G. N. Stokes.
" E. E. Waters, M.D.
" F. W. Sumner.
Lieut.-Col. A. C. MacGilchrist.
" W. F. Harvey.
" M. N. Chaudhuri.
" A. Whitmore.
" S. Hunt.
" R. M. Carter.
" L. P. Stephen.
" G. J. G. Young.
" L. T. R. Hutchinson.
Major R. W. G. Hingston.
" J. G. B. Shand.
" D. G. Cooper.
Captain M. F. D. Graham.
" E. Kean.

* * * * * *

The reviewer cannot conclude this report of the year without again thanking those who have contributed to it. He trusts that, with regard to similar future annual reviews, he may have the assistance of still further contributors; there have been fifteen in all to this present one, but there may be those whom, through inadvertence, he has not written to, but who would be willing to contribute. If so, their reports would be very welcome. Directors of Public Health and of large medical research institutes are, one knows, very busy men, but a *brief* review of the year's work is always very welcome, and perhaps of special value in giving our readers an up-to-date and bird's-eye view of the present position of medical and public health work in India.

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Original Articles.

NEURASTHENIA IN THE TROPICS.*

By HUGH W. ACTON,

MAJOR, I.M.S.,

Professor of Bacteriology, Pathology and Helminthology, School of Tropical Medicine and Hygiene, Calcutta.

THE word "neurasthenia" means nerve debility, and is characterised by a general feeling of ill health, which in turn is associated with introspectiveness, and a morbid dread that some disease is developing or will develop at a future date. The patient in helplessness seeks medical aid, and in his anxiety that nothing should be missed in his case spends hours in introspectively collecting information about himself. He generally presents the physician with a history of his case in four or more pages of close written foolscap detailing the symptoms he has suffered from year after year, month by month, or day by day. The term neurasthenia conveys to the lay public the idea that the source and origin of the disease is due to a debilitated state of the nerves, but without obvious cause. In fact there is the stigma associated with the disease that a certain amount of the symptoms are put on in order to elicit sympathy, or escape work; in other words that the patient is not as bad as he thinks. The opinion of some medical men seems to bear out this accepted view of the lay public, for no attempt is made to find out why these nerves are in this depressed or excitable state. The patient is generally told that his symptoms are all due to nerves; not to worry, but to have made up a prescription containing some beastly tasting medicine like valerian or asafœtida, along with bromides which further depress the nerves. Often in vain the patient cannot obtain relief by medical treatment, so he hearkens to the appeals made to him by the many quack advertisements that appear in the papers that guarantee a cure for his various symptoms. The dread of loss of virility that develops in many of the male patients is fostered by advertisements falsely describing the nature and cure of spermatorrhœa.

In this paper I will endeavour to point out that neurasthenia *is real ill health* associated with certain existing causes, and not merely a feeling of ill health. In the tropics there is a further association with certain predisposing causes that are more commonly present than in temperate climates. It is obvious that before we can obtain a cure we must first deal with any exciting causes, then remove the predisposing causes, and aid the different endocrine glands that are not functioning properly; it is not until then that we can hope to get a real and permanent cure. It is little use trying to quiet the nerves with bromides, or to aid the functions of the endocrine glands by shot-gun prescriptions of the various endocrine products now on the market, before removing the exciting cause.

The causation.—The exciting cause is due to a depression of the function of certain endocrine glands, mainly that of the thyroid, and to a less extent of the adrenal glands. The functions of these glands may be depressed in two ways:—

(1) By the direct action of the toxins of many of the acute diseases that are common in the tropics, for example, enteric fevers, cholera, plague, Shiga's dysentery, smallpox and blackwater fever. These acute diseases, when severe, leave for a long time their after-effects on these two glands. More rarely the depression of function is due to a slow poisoning by chronic diseases such as malaria, syphilis, hookworm infection, etc. In women we have also to consider the question of septic diseases of the genito-urinary tract.

(2) The most fertile cause is an interference with the digestive functions which is brought about partly as the result of toxins, and partly by putrefactive changes in the gut. Such diseases as pyorrhœa often set up a gastritis which in turn may be associated with gastric or duodenal ulcer. They invariably produce profound changes in the digestive processes that take place in the gut. The commonest cause after pyorrhœa is that due to chronic dysentery, both the amœbic and bacillary type. In such cases, when the stool is plated, instead of getting the typical colonies of lactose fermenters belonging to the coliform group, we find a large number of opaque non-lactose fermenters, streptococci, and sometimes yeasts. The alteration of the whole of the intestinal flora must play an important part in this slow process of poisoning (toxæmia), for it means that the body has to deal with a totally different group of end-products of these new bacteria, that now inhabit the intestine.

The predisposing causes.—The predisposing causes are much more numerous in the tropics than in temperate climates, for these reasons:—

(1) There is a greater tax on the body as the result of the continued high atmospheric temperature and the excess of humidity, for the skin continually requires a large quantity of blood to keep up the continual perspiration, in order to keep the body temperature lower than that of the atmosphere. Eastern races recognise this, and therefore rarely eat a meal during the heat of the day. The two main meals are taken first thing in the morning and towards evening. To add to these difficulties of retaining the body temperature at normal, i.e., 98.4°F., European dress (particularly amongst men) is totally unsuited for the tropics. Starch collars, three or four layers of clothing covering the body such as the coat, waist-coat and shirt do not help the rapid evaporation of the sweat. The long nightgown

* Being a paper read before the Medical Section of the Asiatic Society of Bengal on Monday, the 22nd November, 1926.

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of the Arab may not be becoming, but is very comfortable and cool.

(2) The tendency to the production of anæmia that occurs by lack of ventilation during the hot weather. In the day time to keep the rooms cool the doors and windows have to be locked up, and the only circulation of air is by the fan churning it round and round without replacement. Sleeping under a mosquito net at night time is another fruitful source of living in an atmosphere charged with an excessive amount of carbon dioxide. Both these defects in our present methods of living could be corrected by the use of thermantidotes during the day, or better still a cool room such as we have at the Calcutta School of Tropical Medicine, and the use of proper electric fans at night in order to keep off mosquitoes. A low mosquito net 2½ to 3 feet high round the four sides of the bed and open at the top would protect the hands and feet from their bites, and would allow free access of air.

(3) The poor quality of the food during the hot weather. For at least seven months in the year, the quality of the meat is distinctly poor in the markets. In the *mofussil* conditions are still worse, for these people rarely get any meat other than fowl. In fact in the *mofussil* one lives on the chicken before it is born—i.e., as an egg, and starts cooking it before the flesh has got cold or has hardly had time to die. Only during the winter months does the quality of the beef and mutton improve, and then there is also a great variety of game in the larger markets. During the hot weather vegetables likewise are difficult to procure and of a poor quality.

(4) The inadaptability of the Indian cook to European methods of cooking. Amongst Indians it is the custom to eat highly spiced curries and similar dishes cooked with a large amount of capsicum, which is very irritating to the stomach for those who are unaccustomed to these hot spiced dishes. To add insult to injury these curries are generally cooked in mustard oil which contains the irritative allyl isothiocyanate, and only people who are accustomed to use mustard oil for cooking can take foods cooked in it for any length of time without developing hyperchloridia. The Indian cook, in a similar way, loves to make every dish as greasy as possible, therefore he adds ghee, olive oil, etc., on every possible occasion, in spite of the fact that this is not the English way of cooking food. The Indian in the same way is not accustomed to the high protein diet of the European, and many of them find it difficult to digest meat in any form, but prefer their vegetarian dishes cooked in their own particular way.

(5) The fetish of exercise. In the East during the hot weather the motto of the poets is to be indolent and lie in cool places like sheltered gardens, and strenuous exercise is only indulged in during the cooler season. The European on the other hand has an idea that to keep fit in the hot weather he wants plenty of exercise and this idea is more ingrained in the neurasthenic. The result is that such strenuous games as hockey, football, tennis, etc., are played during the most gruelling time of the year with the idea that these persons keep fitter after profuse perspiration. In business cities like Calcutta the whole of the exercise for the week is taken at the week end, commencing on Saturday and ending on Sunday night. The result is that many of these office workers arrive on Monday morning tired and unable to work properly. Thus it is obvious that all these various predisposing causes play a very important part in increasing the depression commenced by the toxins of any exciting cause.

The production of neurasthenia.—The first effect of the combined action of the exciting and predisposing causes is shown by a depression of the function of the thyroid gland, a condition known as hypothyroidism. Symptomatically this hypofunction is shown by feeling cold, even in very hot weather, and such persons will require woollen garments or blankets at night time. There is also a loss of the condition of the hair, the development of alopecia along the forehead and the outer eyebrows, and the skin is slightly harsh and dry. As the basal metabolism rate is lower than the normal, so there is also a general depression in both the bodily and mental activities of these patients, except when excited under the stress of external stimuli. Coinciding with this depression of the thyroid gland we have a similar change in the adrenal medulla, so that the tone of the sympathetic nervous system is working at a lower ebb. This is further shown by a loss of tone in the whole of the involuntary muscular system; the pulse tension is low, and on pressing the skin with the nail one often sees the white adrenal line. This loss of tone occurs also in the involuntary muscles of the digestive tract, so that dilatation of the stomach (atonia) or distension of the large intestine with constipation is often present in these sufferers. On the skin, the result of adrenal deficiency is sometimes shown by the development of a slight increase in pigmentation of the face, so that these persons have a sallow muddy complexion. More rarely, there is a development of chloasmic patches on the cheeks or on the side of the neck. As the activity of the gonads is closely associated with the adrenal function, we now observe the effects of the depression of these genital organs in the two sexes. In the male there is first a loss of tone in the musculature of the vesiculæ seminales and the erector and ejaculator muscles; this is partly responsible for the lack of control and nocturnal emissions. Still later as sexual power diminishes impotence, and to a lesser degree sexual anæsthesia, develop. In the female there is a disinclination for sexual intercourse, and if anæsthesia is present partial satisfaction can only be gained by sublimation, as by narcissism, or by clandestine love.

Whilst the function of the endocrines concerned with the tone of the sympathetic nervous system is always depressed by these causes, the functions of the parasympathetic glands are not

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affected or may even be stimulated; thus sometimes there is an increased function of the anterior lobe of the pituitary gland which is shown by the skin being very harsh, combined with the loss of body fat. If the disease starts early before the epiphyses have united, the patients are often thin and lanky. At present we know little about the changes taking place in the pituitary gland. The function of the prostate is increased, which leads to excessive secretion, and this in turn is aided by the lack of tone of the vesiculæ seminales and penile muscles. Hence there is a loss of control, which causes spermatorrhœa during the day and emissions at night. In women there is sometimes an increase in the function of the adrenal cortex, so that an excessive amount of hair (hypertrichosis) develops on the face, abdomen, and legs. As a rule the amylase function of the pancreas is diminished, so that these patients have frequently starch indigestion, and in the cases that Dr. J. P. Bose has examined for me the blood sugar has been low. Sometimes the parathyroid gland seems to share in this general depression as is shown by ulnar erythrodermia, irritability of the involuntary muscles, by twitchings of the orbicularis palpebrarum, and colicky pains in the abdomen. Twitching, cramps, and myotatic irritability of the voluntary muscles are also observed. There is a general excitability of the whole of the parasympathetic nervous system so that tremors of the hands, excessive perspiration of the hands, feet, legs and axillæ occur on the slightest mental excitement.

In Indians who are as a rule more parasympathetic than Europeans, stimulation of the prostate is more evident, whilst the functions of the pancreas and parathyroid are not disturbed to anything like the condition present amongst Europeans.

The effect on the central nervous system.—Concurrently with the depression of the sympathetic nervous system and its related endocrine glands, there is a general loss of tone and a feeling of not being up to the mark. The patient now seeks within himself the reason of his ill health. The effect of this is chiefly shown in the highest conscious centre and is exhibited

(1) By introspectiveness. This means that the patient's mind, which in normal health was not concerned with his bodily functions and only took an interest in his external surroundings, now seeks for some cause for his disease within his own body, and therefore develops a sense of visceral consciousness. As you know, normal individuals are not conscious of their heart beat, nor are the pulsations of the carotids audible to the ear, nor are we aware of any movements that occur in the stomach or alimentary canal during digestion. In these neurasthenics, the sense of visceral consciousness becomes well developed and every abnormal movement becomes more and more conscious to them. Thus when lying down in bed on the left side, the heart is felt beating, and as the attention is concentrated on this fact, the heart action becomes quickened. A sense of fear now develops that perhaps something is wrong with the heart. The rapid and more powerful action of the left ventricle makes the pulsations in the carotid arteries of the neck felt and heard. Owing to indigestion, which is often present and due to atonic dyspepsia, the pressure on the heart still further accelerates its action, and often there is an irregularity in the action of the heart at these times, so that palpitations are now noticed. The fear that heart disease has developed or is developing becomes a constant dread in the mind of the patient. The saying that most of the heart diseases diagnosed by the patient are not due to heart disease but to indigestion is very true for these cases. With the atonic condition of the large intestine and the presence of constipation colicky pains become more and more pronounced, and this gives rise to the fear that some fatal disease like cancer is developing in the abdomen. As the result of this continual dread that at some future date a fatal disease may develop and carry off the patient, a condition known as *morbid anxiety* becomes fixed in the patient's mind.

(2) Morbid anxiety. As you know, every medical student when first reading medicine in his third year imagines that he is suffering from tuberculosis, heart disease, or cancer. With an increase in knowledge and with experience these morbid anxieties disappear from his mind in a short time. With the neurasthenic individual, the morbid anxiety is developed—not without cause, but as the result of the irregular function of his various organs. He culls his medical knowledge from advertisements in the lay papers, and finally usually gets hold of some cheap semi-scientific medical publications on health, virility, etc.

Morbid anxiety in the two sexes.—In the male, at first the anxiety is nearly always concentrated on the idea that some fatal disease has or is about to develop and carry off the patient. He believes that palpitations suggest heart disease, a cough the probability of tuberculosis, the pulsating carotids rupture of a blood vessel in the brain and apoplexy, whilst indigestion is translated to be the onset of an abdominal cancer. Dread of the impending fatal disease looms much more in the patient's mind than the actual fear that death may take place at some subsequent period, should he develop this disease. Closely following the dread of a fatal disease is the fear that in addition to all these sufferings sexual impotence is developing, and this idea is aided and abetted by the many advertisements of cure for sexual deficiencies seen in the papers. Such a patient generally indulges in reading these advertisements in the hope that one or other of the more highly recommended or expensive ones will bring about a cure of this loss of strength. As a result of debility there is an increase in the quantity of phosphates in the urine (phosphaturia). These salts as you know are precipitated as soon as the urine cools, and are regarded by the patient as a

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loss of semen. The quack advertisements claim that semen is a kind of emulsion of the spinal cord and brain, and as it is lost impotence develops and the brain power fails. The loss of prostatic secretion during the day (spermatorrhœa), and the nocturnal emissions are supposed gradually to drain away the vitality of the individual. When marked debility and loss of muscular tone is present, an orgasm can only be obtained with the greatest difficulty and rarely maintained for long, unless it is caused by an extreme degree of mental excitement. As impotence develops in these individuals, it leads to still greater mental distress.

In women, the type of morbid anxiety that is developed depends to a large extent on whether they have experienced sex life or not. In married women there is very rarely any dread of disease, but very often a transferred anxiety or dread is developed, particularly amongst those who have anæsthesia and have had a child. As a result of the lack of satisfaction in sexual life, the sentiment of tenderness or love is sublimated and is transferred from the husband to the child. The women's anxiety is now fixed on the dread that perhaps some day a calamity may overtake her child, and her whole life becomes a living hell lest by accident or disease she may loose her child, and with its death the last solid link that binds her to her home. When there is no child and anæsthesia is present, the sentiment of tenderness is transferred to one of self-adoration or narcissism. At first this is satisfied by the love of self-adornment, but with increasing age there develops a dread of the loss or failure of the power to attract the male sex. The roughening of the skin, the development of pigment spots, wrinkles, grey hair, or a muddy complexion gives a fine field of profit to the patent skin food vendors, beauty specialists, and others who trade on the vanity of these women.

In single women, a dread sometimes develops that some disfiguring or loathsome disease like syphilis, leprosy, etc., may have been contracted during the course of their amours.

Excessive response to external stimuli.—This at first is often shown by nervousness in society or fear to go alone in public places like clubs, etc. This excessive response to external stimuli is more commonly seen amongst women, who must always have a male escort before they appear in public places. In society their nervousness is counteracted by an attempt at excessive hilarity, verbosity, or excessive bodily activity. At home when the same stimulus is not present a reaction occurs in these individuals, and they become morose, peevish, lacking energy, and prone to sulk; to counteract this they must be always out and about—a condition which the French have described as hyper-hypo-thyroidism, indicating that at one time the thyroid is under-functioning, but when stimulated over-functions. In males this restlessness is usually not so pronounced as amongst women, but there is often a tendency to shirk the society of women. Later still in both sexes there develops a dread of the possible effects of these external stimuli, the so-called phobias, for example claustrophobia—the dread of enclosed spaces, etc. In these individuals there is little danger of any suicidal tendencies developing owing to the fear of disease or danger which is paramount in their mind; their anxiety is to live, and by treatment to regain their health. The help they seek from our profession is the right to live in perfect health, and not to get relief by death. Depression of the higher mental functions slowly comes on. At first there is a lack of concentration, then a slow failure of memory: this stage is commonly seen in many of these sufferers. After years of suffering, of excessive stimulation by continued work, the more strenuous efforts of concentration of mind still further increase the depression, which is aided by worry, toxins, etc., and which may in time lead to the development of melancholia, and more rarely to structural changes occurring in the brain, leading to dementia.

Treatment.—The whole success of treatment depends on the fact that a complete diagnosis of the case should be made by the physician and not as is so frequently done to make only a cursory examination and to diagnose neurasthenia by the introspectiveness of the patient. A complete diagnosis often entails numerous very careful and detailed examinations, both clinical and bacteriological, before the following questions can be answered.

(1) *The exciting cause.*—Is it still present or due to some past acute disease?

(2) *The predisposing causes.*—Are they playing any active part in the depression?

When the exciting and predisposing causes have been removed by proper treatment, we have next to consider whether their after-effects are sufficiently severe to require further treatment, and which particular after-effects have to be dealt with.

The *after-effects* we observe are (1) anæmia and debility, (2) endocrine deficiencies, (3) loss of tone of the involuntary muscular system, atonic dyspepsia, cæcal stasis, etc.

Finally a complete cure depends on the ability of the physician *to deal with the mental condition of the patient.* This hinges on whether one is able to convince the patient that whatever is said or suggested is right. There should be no doubt about this in the patient's mind and then cure becomes only a matter of time. The power that was used by the patient to concentrate on and magnify the slightest irregularity of his bodily mechanism is now faithfully employed with even greater effort to aid in effecting to complete the cure that has been promised to him.

The removal of the exciting causes.—I will not attempt to give you a long list of the various exciting causes that may produce this condition of neurasthenia. I will therefore only deal with the commoner causes that I have met with in my experience. Of the acute diseases, I would place

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the enteric fevers first on the list. As you all know, after enteric fevers one of the two things may happen to your patient; he may convalesce very rapidly and put on weight, or he may remain thin and debilitated in a neurasthenic condition. Here the treatment is simple, as the exciting cause has disappeared, and all that is required is to treat the various after-effects of depression by appropriate endocrine therapy.

We have also to deal with chronic diseases, which are more often common exciting causes of neurasthenia. The importance of diseases of the alimentary canal in the tropics is very great, and they are the source of the most of the neurasthenia in the tropics. The evidence of disease in this area is so often so slight in its symptoms as to be overlooked by the physician. Thus dysentery is one of the commonest causes, and the term is correlated in the mind with the syndrome of the passing of blood and mucus, and with straining at stool (tenesmus). In chronic colitis due to the dysentery group of bacteria and protozoa there is no tenesmus, and no visible blood or pus passed in the stool, but there is *one constant sign always present, the passing of mucus.* The bowels are more often constipated than not, but there may be constipation alternating with diarrhœa, or there may be early morning diarrhœa. Except for the presence of mucus, the macroscopic appearance of the stool is not in the least suggestive of a dysenteric infection.

As the presence of mucus suggests a colitis, we have next to diagnose the causative agent.

(1) Amœbic colitis. I do not like the term dysentery for this infection, as the dysenteric syndrome is only a complication in about 10 per cent. of cases. We can diagnose the condition microscopically by the presence of mucus, pycnotic cells, Charcot-Leyden crystals, and seeing the various stages of *Entamœba histolytica* in unstained specimens—encysted forms with chromidial bars, and free forms, *minuta* and pre-adults, by their peacock green colour and their pearl-like vacuoles. When these stools are plated, there are usually found a large number of fine lactose or non-lactose fermenting colonies of streptococci or yeasts as secondary infections. There are three different lines of emetine treatment that may be employed.

(*i*) The combined treatment by alkalies orally and emetine instramuscularly or by intravenous injections. The alkalies may be given in the form of bismuth carbonate ʒi t.d.s. or sodii citras ʒi one hour before the injection of emetine. Emetine is given in one-grain doses daily for 6 days, then one to two days' rest, followed by 4 more doses, a total of 10 grains in 11 or 12 days.

(*ii*) Bismuth-emetine-iodide grs. ii by the mouth in keratine-coated tablets. The dose is preceded by omonpon $\frac{1}{6}$ gr. and when the patient becomes drowsy, the bismuth-emetine-iodide is given by the nurse. This ensures that the emetine is retained by the stomach.

(*iii*) In cases that have failed to be cured by the above methods, one advises a course of streptococcal vaccines from strains isolated from the gut, combined with an antiseptic treatment. Yatren is of value in these cases, but it is a subsidiary drug in treatment and is very expensive. As soon as the bacterial plating results show a return to a more or less normal flora, emetine and the alkaline treatment can be started at once and generally brings about a cure. I hold that the failure of emetine to eradicate *Entamœba histolytica* infection is due to the acidity caused by this intestinal fermentation of the streptococci, which will not allow the emetine to act in weak concentrations.

(2) Chronic colitis due to the dysentery group of bacilli. This condition is generally due to acute dysentery not being treated properly by sufficient rest, salines, etc. Microscopically we find mucus, degenerated shrunken endothelial cells in the mucus stained yellow by stercobilin, and usually accompanied by *Blastocystis* and sometimes *Trichomonas.* On plating, if fortunate, we may find transparent non-lactose-fermentors of the dysentery group, but in the very chronic cases dysentery bacilli are difficult to isolate. Numerous opaque non-lactose-fermentors belonging to the paradysenterica group, etc., are found on the plates. As secondary invaders of the dysenteric ulcers the *B. pyocyaneus, B. fæcalis alkaligenes* and *B. asiaticus* may be found, and still more rarely the *B. Morgani* as a cause of colitis. Sometimes we have to rely on the agglutination reactions.

Treatment consists in regulating the diet as regards carbohydrates, particularly in Flexner and Strong infections. In both types of chronic colitis—amœbic or bacillary—it is wrong to cut down the diet to too low a caloric value, as a liberal supply of easily digested foods is what the patient requires to regain his health.

The curative treatment consists in giving appropriate doses of the vaccine containing the causative agent, and any secondary organisms of the ulcers, e.g., *staphylococcus, pyocyaneus,* etc.

So far I have only dealt with the various causes of colitis, but pyorrhœa of the gums, gastric and duodenal ulcers, and sometimes the sequelæ of colitis—e.g., appendicular inflammation—have to be considered and are extremely important but are outside the scope of this paper. In these cases one ought to examine the teeth, enquire about the mastication of food, the possibility of gastric or duodenal symptoms, and carefully test for tenderness over McBurney's point. Sometimes these cases are a mixture of two or more of these diseases of the alimentary canal.

The removal of predisposing causes.—With patients who are wealthy a change to England or the hills after removing the exciting cause will deal with the whole of the predisposing causes. Unfortunately everyone is not in this position, and the majority of patients have to remain in the plains in spite of these predisposing causes.

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A good deal can be done to eliminate most of them. Fans, proper dress, etc., will do much to eradicate the effects of high temperature, humidity, etc., and when one's mind is fully occupied there is little time to notice the heat, whether one is outside or inside the house, as long as a strong current of air is circulating so as to gain the advantage of the latent heat of evaporation from the sweat. I am strongly against sleeping under mosquito nets when one has a fan that is powerful enough to keep off mosquitoes.

As regards the quality of the food, its variety and cooking should be a subject that every housewife should know all there is to know about it. I have seen a few cases where the cooking has been the exciting cause, and the use of mustard oil, ghee, or lard has been sufficient to cause gastritis, and so give rise to the train of symptoms known as neurasthenia.

The treatment of after-effects.—Anæmia and debility need not be considered, as the treatment of these conditions by iron, etc., combined with good food is obvious to all of you. There are two conditions, however, which I may speak about, as in the tropics these defects are somewhat different to those seen in temperate climates.

(*i*) The endocrine defects. It is first necessary to examine the patient and find what glands have a defective function. The commonest gland involved is the thyroid, then the suprarenals, and lastly the gonads. Other glands, however, may be involved. I therefore do not believe in administering shot-gun prescriptions containing every endocrine gland of the body, but only administer those that I believe to be deficient in function. The next point is that many of these products become useless owing to decomposition in the monsoon months. They are proteins and many are hygroscopic and in a few days they become perfectly useless. The safest way to administer these endocrine glands is in the form of coated tablets, which protects them from the effects of climate. The method of administration is important, and I believe the best way is to give them by injection intramuscularly.

Unfortunately at present we have only adrenalin and pituitrin, but soon thyroxin will be available. Of the two former products I prefer to use small doses, e.g., m. ii. of a 1 : 1000 adrenalin hydrochloride and m. iv. of extract pituitrin posterior lobe once a day for five injections. After these injections I recommend that tablets should be taken by the mouth.

The doses I recommend are small doses of the dried thyroid gland, $\frac{1}{6}$—$\frac{1}{4}$ gr.; of the dried gonads grs. ii; and dried adrenal gland grs. $\frac{1}{2}$, given twice a day on an empty stomach, i.e., first thing in the morning and last thing at night, so as to avoid the action of the gastric juice on these proteins. Cases of neurasthenia that occur after acute diseases like typhoid, etc., do extraordinary well with endocrine therapy. The gland products are of very little value until the exciting cause has been removed by treatment.

(*ii*) Loss of tone of the involuntary muscles as is shown by atonic dyspepsia, cæcal stasis, etc. The condition of cæcal stasis is the more important from our point of view to consider. If visceroptosis is present we must prevent the sagging as much as possible by mechanical means such as an abdominal belt. The prevention of stasis by abdominal massage, and keeping the bowels properly emptied each day by liquid paraffin is of importance. When the intestinal flora has been considerably altered by non-lactose-fermentors, streptococci, etc., intestinal antiseptics are useful, and of these there are many on the market. Whilst the above treatment is being carried out the muscle tone may be greatly improved by the administration of small doses of pituitrin and adrenalin, combined with thyroid gland. Treatment has to be prolonged for some months before these muscles regain their full tone.

The mental condition of the patient.—Here everything has to be done by explanation, and hence it is necessary to devote some time at the beginning of the treatment to clearly explaining to the patient that the disease is not due to nerves, but due to some exciting cause that has been overlooked in his case. As soon as the poisons are prevented from getting into the body from the source, the nerves will very rapidly get into a normal condition. Advice when the sexual functions are being involved is very helpful to these patients. Psycho-analysis would be useful in those cases arising from sexual abuse, but it seems to me in most cases it would be starting at the wrong end of this syndrome, for there is always a cause, which is rarely due to a sexual one in the first place.

SUMMARY.

The subject of neurasthenia is a very big one, and I have tried to portray it as truly as I have seen it in the tropics. The exciting causes are different to those in non-tropical climates whilst the predisposing causes are also dissimilar, but can often be more easily removed by a change of climate, etc. The effect on the endocrine glands and muscular tone is similar, whilst the after-effects on the bowel are more pronounced. Introspectiveness is perhaps less marked with the easier and more varied life in the tropics, but in women the mental aspects of morbid anxiety, etc., are very much more marked by all the predisposing causes of risk of disease, separation from husband or children, etc., peculiar to the tropics.

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In the discussion on Major Acton's paper

Major R. Knowles, I.M.S., said that he hoped that Major Acton's most interesting paper would receive early publication and would reach a much larger audience than was present at the meeting. He had been

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very much struck with the frequency of "visceral neurasthenia"—as one might term the condition—in Englishwomen who had lived for some years in India; also with the severity of the symptoms in some of these patients. Thus in a recent case under observation the most agonising attacks of abdominal pain had occurred off and on for nine months; an exploratory laparotomy had been suggested, but a well fitting belt had cleared up all the symptoms. As for chronic amœbic colitis, he wished that someone would tell him how to treat the condition successfully; he had been trying to discover the best line of treatment for it for years, but hitherto without success.

Major V. B. Green-Armytage, I.M.S., speaking as a gynæcologist with twenty years' experience, said that he was more interested in the study of the patient as patient than in laboratory procedures. In his opinion, as the result of searching enquiries among his patients, he thought that there were three main causes of tropical neurasthenia, viz. (*a*) masturbation, (*b*) coitus interruptus, and (*c*) sexual starvation. The view that it was due to not wearing a heavy sun topee was drivel.

In hot climates he considered that masturbation occurred in quite 70 per cent. of males in the absence of their wives at Home or in the hills. Also it was extremely common in females in the hot weather. The husband would go to office leaving the wife to secure what sleep she could in the hot weather afternoons, and this led to the practice. As for coitus interruptus the present century might well be called the contraceptive one, what with its advertisements of quinine pessaries, "Prorace" pessaries, and the like. The end result of coitus interruptus for the women was a chronic plethora of the broad ligaments, leading to a condition of varicosity akin to varicocele in the male; whilst erosions and endocervicitis followed the use of quinine and contraceptive pessaries, with absorption of toxins and consequent neurasthenia. The result of sexual starvation in the male had been strikingly illustrated by the suicides of two Englishmen in Government service in the Far East lately. Both men were in a good financial position and free from marital or other worries. But in both instances their wives had been at Home for more than two years. Under such condition, when a married man tried to lead a "straight life," he became the subject of an inferiority complex, which resulted in psychic trauma. Such cases he considered to be very common in the East.

In women narcissism was not so important a factor as the dread of child-bearing. The dread of the onset of pregnancy was the starting point of neurasthenia in many European women in the tropics. The use of abortificients by such patients led to chronic gastritis, and the cumulative effect of repeated crises during which the patient fears that she is pregnant leads to rapid nervous prostration. He considered that the sex element would account for quite 90 per cent. of the cases of tropical neurasthenia. Women with neurasthenia of sexual origin were often of masculine type.

Lieutenant-Colonel W. L. Harnett, I.M.S., dwelt upon the importance of septic foci as an exciting cause in tropical neurasthenia. With regard to the prostate, which Major Green-Armytage had mentioned, his experience was that chronic infection of the prostate was very common in European male neurasthenics, together with symptoms of "spermatorrhœa." In such cases prostatic massage and examination subsequently of the prostatic fluid expressed shewed numerous pus cells present in the discharge. There were two main types; (*a*) with gonococcus infection still present in the prostate and the vesiculæ seminales, but without neurasthenic symptoms; and (*b*) with only prostatic infection present and pronounced neurasthenia. In the latter case no gonococci could be discovered in the majority of cases, but secondary infection with pyogenic organisms had occurred. The results of proper treatment of such patients —especially by diathermy—were very striking. They experienced a sense of well-being such as they had not known for years. With regard to Major Green-Armytage's enquiry as to the physical results of masturbation in the male, he understood from published articles and text-books that examination of the posterior urethra in such cases often shewed vascular congestion present. In conclusion he would emphasise the importance of chronic prostatitis as a cause of tropical neurasthenia in the male.

Dr. G. Panja spoke of the question from the Indian point of view. Heredity was a pronounced element in tropical neurasthenia, and should not be neglected. Neurasthenia was especially seen in India women with the loss of sexual activity, also especially in Indian widows who had borne no children. In both sexes of Indians to have had no child was a frequent source of mental brooding and neurasthenia. Further contributory causes in Indian women were repeated pregnancies and lactation, and the want of exercise and fresh air consequent upon the purdah. The drug usually prescribed for the condition was mercury in some form or other, and it did but little good. He had known hypodermic injections of distilled water to hypnotise the patient into the belief that she was rapidly recovering, whilst hydrotherapy and suggestion were especially indicated.

Lieutenant-Colonel A. H. Proctor, I.M.S., insisted on the great importance in such cases of getting a full and detailed history out of the patient. This was too often neglected; the case was labelled neurasthenia and the past history entirely neglected. It might be necessary to go right back to the patient's childhood or early youth to discover important factors in the case; the sex element in neurasthenia had been dwelt upon in the discussion, and nothing but the most searching enquiries would elicit important points. Head injuries were a not unimportant cause of tropical neurasthenia in Europeans in the tropics; thus a man might sustain a "trivial" head injury at polo or when riding, and its effects translate themselves into neurasthenia. Surgical operations were a further important cause; men had a trivial surgical operation—such as an operation for varicocele—performed upon them, then went back to work before they had really recuperated, and broke down. Surgeons should learn to view their operations from the patient's point of view, and a surgical operation meant a very big amount of psychic disturbance and trauma to the patient, however trivial it might be. Tropical dysentery and chronic amœbic colitis he considered to be quite as common in the non-neurasthenic as in the neurasthenic. The great frequency of healthy carriers of *Entamœba histolytica* who never suffered from any symptoms shewed that this infection could not be so ultra-important in the ætiology of tropical neurasthenia.

In replying to the discussion, Major Acton pointed out that his paper was concerned chiefly with conditions that were more or less peculiar to the tropics, and he had no intention of dwelling upon the enormous number of contributing factors that could be present from other diseases. He considered that there was always an initial lesion which left its effect on the endocrine glands, and as a result of the depression of the body health, the mental condition of neurasthenia developed by degrees. The sexual aspects of the condition he considered were secondary, and usually the results of neurasthenia rather than the cause of it. It was quite possible for sexual causes to be the primary factor, but this was a much rarer condition. He did not agree with the Freudian view that every impulse in the body arose from a sexual motive. Reproduction was not a primary instinct in nature, but developed when food supplies were adequate for the individual and for his offspring. The primary instinct of life was self preservation, which was well illustrated amongst the cases he had seen, as these patients were usually desirous of living and getting well. He agreed that sexual starvation in the male was a contributory cause, as had been evidenced in the Eastern theatres during the war. He admitted the importance of chronic prostatitis as a septic focus leading to neurasthenia, and it was very frequently bound up with the dread of venereal disease and its effects. Psychic

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trauma was well seen in those patients who had had many surgical operations for misplaced organs like floating kidneys, etc. The dread of the operation, the mental anxiety during its anticipation, especially with patients who are kept for hours waiting for an operation, and then sent back to be done another day was great. This influence was so strong that in persons with status lymphaticus the mere effect of a surgical examination or trivial operation was sufficient to cause death. With reference to Colonel Proctor's remarks about case histories, the patient usually gave this in full wealth of detail. Chronic amœbic colitis he regarded as one of the most important exciting causes of tropical neurasthenia, in spite of all the arguments which he heard to the contrary during the evening's discussion. He pointed out that his paper had been strictly limited to the effects of tropical diseases in the production of neurasthenia as he had seen during his experience in India.

He thanked the various speakers for joining in the discussion and putting forward their own points of view.

KETOSIS IN ACUTE FEVERS.

By H. HINGSTON, M.D.,

MAJOR, I.M.S.,

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It has long been known that during the course of an acute fever ketone bodies may appear in the urine. I do not think it is generally recognised that this occurrence means that an important pathological disturbance of metabolism is present, and that it is a real indication for special treatment.

Further, I am firmly convinced that this disorder of metabolism is the cause of many of the more acute symptoms seen in these fevers and usually attributed to "toxæmia." It has been my privilege during the last year to have many cases of enteric group infections, pneumonias, septicæmias and similar diseases under my care. In all these diseases nervous symptoms of varying severity are sometimes the most difficult symptoms with which the physician has to deal.

Headache, delirium, muscular twitchings, picking at the bed clothes, insomnia (especially in pneumonia) are all conditions which indicate a derangement of the nervous system.

A routine examination of the urine for acetone very definitely shows that when these symptoms are present there is in almost all cases a very marked acetonuria.* In fact I have not seen these symptoms without acetone in the urine except in very severe infections as a terminal manifestation. A more important and a very striking clinical fact is the rapid disappearance of these symptoms when treatment is vigorously carried out to combat the ketosis.

Before discussing the treatment it may be advisable to attempt to explain the pathological conditions underlying the appearance of acetone and diacetic acid in the urine. I know only too well that the whole question is complicated and difficult, and that the following explanation will not satisfy the biochemists in its entirety. Still it is logical and simple. It is the explanation that I give to the enquiring student, and above all, it forms an excellent argument for the treatment adopted.

The basis of the argument is that in these cases the presence of ketone bodies in the urine means the presence of oxybutyric acid, diacetic acid and similar acids in the blood, and that these acids must be formed by the incomplete metabolism of fats. The old explanation that satisfactory metabolism of carbohydrates is necessary for the complete metabolism of fats still holds good; in fact the sugar is the fuel that burns up the fats.

In these cases the patients are wasting rapidly. A man with typhoid fever may lose two pounds a day and it is clear that the greater part of this loss is in the fatty tissues of his body. It is the same as if he were using up a great quantity of his fat. It must be efficiently oxidised or the acids of incomplete metabolism will appear in his blood.

Now these patients are receiving little food in most cases, and they certainly are not obtaining sufficient carbohydrate to burn up the excess of fat that is undergoing metabolism. This explanation immediately leads one to a simple and effective method of treatment; the administration of glucose and alkalies in comparatively large quantities.

It is probable that as a routine measure in these cases for many years alkaline mixtures have been the most popular medicines. During recent years the administration of glucose has been vaunted and more especially the intravenous injection of glucose solutions in pneumonia.

The alkalies have been considered to be effective diaphoretics and diuretics and glucose a heart stimulant, but I cannot remember having heard that their efficiency may be due to their effect in combating the ketosis that is present, although I am of opinion that this is by far their greatest—if not their only—claim to therapeutical importance. I also think that those physicians who have claimed that severe toxic symptoms are rare in such fevers as typhoid when the patient is given a good mixed diet are dealing with this ketosis in a similar manner.

The method of treatment that I have adopted during the last year is simple in the

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*The word acetonuria is convenient and in common use and in this paper has been used throughout to indicate the presence of ketone bodies in the urine; chiefly diacetic acid—as tested for by Rothera's method.

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extreme and is very satisfactory. The alkaline mixture used is:—

Potassium citrate	2 drachms.
Liquor of ammonium citrate ..	2 drachms.
Sodium bicarbonate ...	30 grains.
Spirits of aromatic ammonia	30 minims.
Water up to 1 ounce.	

One ounce of this mixture is given in 2 ounces of water every four or six hours according to the severity of the symptoms and the amount of acetone in the urine, as judged by the rapidity and depth of colour by Rothera's method. Two drachms of glucose are given every two or four hours.

In twenty-four hours the acetone has disappeared from the urine and in the great majority of cases the condition of the patient has vastly improved.

The patient is then given a simple alkaline mixture three times a day and two drachms of glucose every six hours.

A patient admitted with typhoid of ten days' duration will be delirious and semi-conscious. He will be picking at his mouth and at his bed clothes. His tongue will be dry and his pulse weak and perhaps rapid.

In thirty-six hours all this will be changed and he will be lying quietly, sleeping most of the day and night, and in fact will be the type of case that we all like to see and that causes us no anxiety.

A similar result is seen in severe pneumonias. Of course this treatment will not shorten the duration of the disease, whatever it may be, neither will it forestall the complications that may ensue, unless "toxæmia" is considered a complication. It certainly does lessen the nervous symptoms and changes the whole aspect of a bad case, if the treatment is commenced sufficiently early in the disease.

The attached table shows the last twenty consecutive cases of typhoid fever under my treatment in this hospital.

In addition to these, two patients were brought to hospital extremely ill and suffering from what appeared to be typhoid fever as judged by the history and clinical symptoms. They both died shortly after admission, before pathological investigations were carried out, and are therefore not included as proved cases of typhoid fever.

In addition to the medicinal treatment outlined above, the further treatment of our typhoid cases was very conservative. The diet was invariably milk, and if any symptoms of abdominal distension or diarrhœa ensued only lime whey was given. As much fluid in the form of water as the patient would take was also given. I could not discover that the glucose caused any indigestion or flatulence but I formed the opinion that it was an important factor in preventing great loss of weight and prostration.

It is not claimed that this method of treatment greatly lessens the mortality or the appearance of complications in typhoid fever, but I am certain that it is as simple and as logical and as effective as any. Certainly during the last year I have not seen a patient who remained in the "typhoid state" for more than thirty-six hours after the treatment was started, although many arrived in hospital with marked nervous symptoms associated with acetonuria.

The cessation of these symptoms is just as marked in other septicæmic conditions and in pneumonia.

Although it is rather outside the scope of this paper, there may be some interest in analysing the pathological findings in these cases. The number is admittedly very small, but I think it fairly summarises our experience of the much greater number of cases seen during the year.

In this series only the routine hospital examinations were carried out and no special investigations were made with a view to publication or clinical research.

The hospital routine in all cases that may be enteric group is as follows:—

(1) The urine is examined and total and differential leucocyte counts are made in the clinical laboratory. Malarial parasites, if present, would be noted during this examination.

(2) On the day following admission blood is taken from a vein and is cultured for bacteria and for Leishmania flagellates and a portion reserved for agglutination reactions. If it is considered necessary, either from the history or symptoms, the formolgel test and the Wassermann reaction may be done.

(3) On the third or fourth day, when the patient has settled down, Marris' atropine test is done (vide *Indian Medical Gazette*, Dec. 1926).

(4) Later, in some cases examinations of the urine and stools are made for the presence of the *Bacillus typhosus*.

(5) Agglutination reactions are carried out at a later date if the previous ones were at all doubtful. A positive reaction of 1 in 125 by Dreyer's method is considered sufficient to make a definite diagnosis in a non-inoculated patient, even if all other tests are negative. The reverse is by no means true.

In this short series of twenty cases the following points will be noticed.

(1) Acetonuria was present in eleven cases. These were clinically the more severe cases. The average duration of disease on admission in these was 12.5 days, and in those without acetonuria 7.3 days. Every patient admitted on the 12th day or later showed acetonuria.

Patient No. 15 was admitted on the 11th day without acetonuria. It was a very mild case.

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He was walking about and was taking a fair diet.

(2) Blood cultures were positive in 14 cases and were negative in 6. Of these six cases, one culture was contaminated; one and sometimes in association with a growth of *B. typhosus.*)

Two were taken after the 20th day.

Two were negative on the 8th and 12th day respectively.

No.	Name.	Cast and Sex.	Age.	Day of disease.	Acetone.	Summary of chief pathological findings.	Summary of course and complications.	Result.	Days in hospital.
1	D.	Indian Christian F.	13	5	—	*B.C. +*U. + Agl. — 1 : 25 on 6th day. Agl. +1 in 125 15th day.	A mild case. No complication.	C	34
2	S. O.	European F.	10	5	—	B.C. + U. + *St. + Agl. + 1 : 250.	A typical case with rather high fever. No complications.	C	35
3	A. H.	European M.	12	11	+	B.C. + St. + Agl. + 1 : 250.	A typical case. No complications.	C	32
4	R. S.	Jewish F.	9	9	—	B.C. Streptococci 10th day. Agl. + 1 : 50 & later + 1 : 160.	A mild case. No complications.	C	35
5	L.	European F.	11	8	—	B.C. - St. + U. + Agl. + 1 : 125.	A typical case. One hæmorrhage on 21st day.	C	33
6	P. K.	Indian Christian M.	14	10	+	B.C. + St. + Agl. + 1 : 125. Wassermann +	A severe case, very ill on admission, no complications.	C	35
7	M. A.	Indian M.	45	23	+	B.C. — Agl. + 1 : 500, etc.	Fever continued and patient died on the 37th day.	D	14
8	C.	Indian F.	12	22	+	B.C. —St. — Agl. + 1 : 250.	Not severe. Had received fair diet previous to admission. No complications. T. normal, 27th day.	C	24
9	E. R.	Anglo-Indian M.	11	8	+	At first all test — buts on 29th day B.C. + Agl. + 1 : 125.	An unusual case. First thought to be K. A. No complications.	C	32
10	I. K. D.	Indian M.	30	12	+	B.C. + Agl. + 1 : 125.	Very drowsy and delirious on admission. No complications.	C	29
11	S. D.	Indian F.	35	6	—	B.C. + Agl. — 1 in 25 on 8th day. St. — Agl. + 1 in 125 on 20th day.	A mild case. Femoral vein thrombosis.	C	65
12	A.	Indian M.	25	12	+	B.C. + St. + U. + Agl. — on 3 occasions.	Delirious on admission. No complications but remained very weak.	C	66
13	F. D.	Anglo-Indian M.	11	8	—	B.C. + Agl. + 1 in 250.	Mild case. No complications but slight fever after convalescent.	C	52
14	C. D. P.	European M.	8	5	—	B.C. + St. — Agl. + 1 in 125.	A very mild case. T. normal on 19th day. No complications.	C	29
15	S. N. C.	Indian M.	28	11	—	B.C. + U. + St. — Agl. — 1 : 25 on 3 separate occasions.	A very mild case. No complications.	C	56
16	B. L. G.	Anglo-Indian M.	33	9	—	B.C. + U. + Agl. + 1 in 250.	A private ward case. One hæmorrhage on 28th day. T. remained above normal for many days during convalescence. No complications.	C	62
17	M. S.	Indian M.	10	12	+	B.C. — U.— Agl. + 1 in 125.	Fever of irregular type. No complications.	C	36
18	B. F.	Anglo-Indian F.	2	8	+	B.C. + U. + St. — Agl. +1 in 250.	A severe case. Became convalescent on 28th day. Developed otitis-media and double parotitis later and died 54th day.	D	46
19	E. C.	Anglo-Indian F.	10	8	+	B.C. (contaminated) U. +St. — Agl. +1 in 125.	A typical case. No complications.	C	40
20	H. R.	European M.	25	12	+	B.C. + U. + St. — Agl.	A severe case. Delirium on admission. No complications	C	56

*B.C. + = Blood culture positive to *Bacillus typhosus.* Organism proved by sugar reactions and agglutination by standard serum.
St. + and U + = Stools and urine cultured show growth of *Bacillus typhosus* proved as above.
Agl. + = Agglutination by Dreyer's standard method positive.

grew a streptococcus. (This has occurred previously on several occasions in proved typhoid cases, sometimes as a pure growth

(3) Urine cultures were done in eleven cases during active disease.

Eight were positive and three negative.

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(4) Stool cultures were done in 12 cases. Five were positive and seven negative.

(5) Agglutination reactions.

Three were negative early in the disease (8th day or less) but became positive later. On the other hand, other cases as early as this were very definitely positive.

Cases 12 and 15 are of interest. Although definitely proved to be cases of typhoid, the agglutination reactions remained negative throughout the disease and during convalescence. This has happened previously during the year.

Conclusions.

Certain conclusions can be drawn even from this small number of cases.

(1) The examination of the urine for acetone and diacetic acid is of extreme importance and forms an important basis for treatment.

(2) None of the pathological investigations are infallible. Blood culture is the most reliable method early in the disease.

(3) Culture of the urine is much more frequently positive than culture of the stools. This is of importance in connection with the examination of carriers.

(4) The agglutination reaction in most cases becomes positive as the disease advances, but may remain negative throughout convalescence.

I have to thank Lieut-Col. Holdich Leicester, I.M.S., acting Principal of the Medical College, Calcutta, for permission to publish these cases, and Major G. Shanks, I.M.S., under whose supervision the pathological work was carried out.

A NOTE ON THE PARASITE OF "DERMAL LEISHMANOID."

By Assistant Surgeon B. M. DAS GUPTA,

Assistant Professor of Protozoology, Calcutta School of Tropical Medicine.

THE condition known as "dermal leishmanoid," first described by Brahmachari (1922), has now become a commonplace at the Calcutta School of Tropical Medicine. Every month some three or four such cases are seen in Major Acton's skin outpatient clinic at the School and are sent to the Protozoology Department for examination.

The history of these patients is a typical one. In the great majority of cases they have suffered from kala-azar for which they have been successfully treated with antimony injections, with complete recovery. Some months—or more usually years—later tiny leucodermic spots appear on the skin, especially of the face, forearms, trunk, and in the case of the male of the scrotum. This is followed by the development of soft non-ulcerative granulomatous lesions. The final appearance of the patient is often suggestive of nodular leprosy, whilst one recent case—illustrated in the *Annual Report of the Calcutta School of Tropical Medicine* for 1925—simulated xanthoma tuberosum multiplex, and the condition had lasted for sixteen years.

In a few instances no history of previous kala-azar can be obtained, but all the patients come from kala-azar endemic areas. Apart from the skin lesions their general health is normal, and the laboratory findings are always the same. Films from the lesions show leishmania, sometimes in very considerable numbers, sometimes in only scanty numbers, whilst cultures from the lesions give a rich growth of the herpetomonad form of *Leishmania.* Cultures from the patient's peripheral blood for leishmania are invariably negative, and on those occasions when an enlarged spleen permitted spleen puncture, films and cultures of spleen juice have invariably given a negative result. The condition thus appears to be one of purely cutaneous leishmaniasis, associated with no visceralised infection.

Is the parasite which causes these lesions *Leishmania donovani* or *Leishmania tropica*?

The whole trend of the clinical evidence goes to show that it is *Leishmania donovani.* The association of the disease with kala-azar, and the distribution of the lesions on the body are evidence for this. The lesions themselves are of a proliferative granulomatous character with no tendency to atrophy of the skin or to ulceration—(except in some instances in the scrotum where irritation has occurred from the clothing, with secondary sepsis).

The following experiments in connection with one of these patients shew that the leishmania parasite concerned in this infection is capable of causing a generalised, visceral infection.

The patient, a Hindu male, aged 27 years of age, was well nourished and had no enlargement of the spleen or liver. He had kala-azar three years ago, was treated with antimony injections, and made a complete recovery.

On examination, small leucodermic spots were present on the forehead and chin, and a few small nodules on the left ear. The duration of the condition was about two months.

One of the nodules was painted with tincture of iodine and then with alcohol, and a tiny piece of the growth snipped off with fine scissors and placed in a sterile Petri dish. This was next cut into three bits. Two were sown direct into the water of condensation of NNN medium, whilst films were prepared from the third piece. Scanty leishmania were found in the films.

The NNN cultures were incubated at 22°C., and shewed no growth on the fourth day. On the twelfth day, however, both cultures shewed positive results. Films were

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prepared, fixed over osmic-acetic acid vapour and stained with dilute Giemsa's stain (Shortt's technique, 1923). Many flagellates were found, both free and in rosettes, together with some rounded forms shewing badly staining nuclei and probably degenerating.

Next day the water of condensation of one of the tubes was diluted with a little citrated saline, aspirated into a hypodermic syringe, and the material injected intraperitoneally into two (English) white mice.

One of the mice was killed 94 days later. Its spleen was found to be enormously enlarged, the other organs being apparently normal. A culture was taken from its spleen by the following technique:—

The body of the animal is placed on its back on a tray of paraffin wax, the surface of which has been previously washed with lysol, and the legs fastened down with pins.

The fur of the chest and abdomen is cut short and the skin thoroughly painted with tincture of iodine. The abdomen is opened with fine scissors and an assistant holds aside the abdominal walls with sterile forceps. With fresh fine sterile scissors and forceps tiny pieces of the spleen and liver are snipped off and immediately dropped into the water of condensation of tubes of NNN medium.

Prior to using this technique I have twice tried the method recommended by Christophers, Shortt and Barraud (1926) of grinding and emulsifying the tissue in saline and inoculating the NNN tubes with the emulsion, but on both occasions all the cultures taken became contaminated. With my present technique contamination has never occurred.

The cultures from the spleen and liver of this mouse showed scanty flagellates present on the 18th and 19th days, together with a large number of aflagellate forms. In sub-culture there was a fairly rich growth, and the strain has been maintained by sub-culture.

Smears were also taken from the heart blood, spleen, liver, and bone marrow, but showed no parasites. The films of the heart blood showed marked basophilia, but this is not an abnormal finding in the white mouse.

The second mouse died at night, 95 days after inoculation, and was not examined, as its organs were decomposed the next morning.

The fact that the *Leishmania* parasite concerned in dermal leishmanoid is thus capable of producing a visceralised infection in a susceptible animal goes to show that it is *L. donovani*, and not *L. tropica*.

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A SIMPLE METHOD OF DEALING WITH DESTRUCTIVE LESIONS OF THE LIDS.

By R. E. WRIGHT,

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Superintendent, Government Ophthalmic Hospital, Madras.

A MALE Hindu patient was admitted to hospital with a large crescentic slough involving the whole of the lower lid except a narrow rim close to the lashes. The limit of the damaged area lay over the inferior border of the malar bone. A smaller crescentic area of the upper lid was gangrenous. The damage had been produced by irritant remedies applied over the eye as a plaster. This method of treatment is not infrequently adopted by village quacks for acute conjunctivitis and other infections of the eye, and the practitioner may find the results very difficult to deal with. In spite of the greatest care, extensive ectropion is liable to set in rapidly, followed by exposure ulcer of the cornea and panophthalmitis. Even to the eye specialist, the plastic procedures which may be adopted to meet these sequelæ present considerable difficulties, so that any simple means of preserving the eye and maintaining its function should be of general value under such circumstances. The case recorded illustrates perhaps the simplest method of dealing with a condition of this sort. The damaged area was exceptionally big; so the decision as to the type of plastic operation to adopt was left over for consideration and immediate treatment confined to tarsorrhaphy. The lids were brought together in their middle two-thirds in the usual way, considerable care being exercised in dealing with the narrow skin margin above and below the lashes. They united well and the stitches were removed as soon as possible, no damage being done to the skin rims by sutures or beads. In dealing with such lesions one has the choice of many operations and some of them are very valuable. We have practised here various types of flaps, epithelial outlays, and so on, but all such procedures offer considerable difficulties and are for the most part out of the question for the practitioner who has no special facilities. It was at first thought that an extensive plastic operation would be necessary. As time went on, however, it became apparent that the cicatrices were going to be smaller than was anticipated, and the narrow belts of skin which bordered the lids' margins had extended upwards and downwards to quite a

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considerable extent. Finally it was decided not to excise the scars or do anything further than merely open the lids at the junction of the inner and middle thirds for a short distance just enough to enable the patient to see. This was carried out, and the patient was kept under observation to determine whether a partial ectropion would occur or pouting of the conjunctiva would obscure the aperture. Nothing of the kind happened and although the cosmetic result was indifferent, the function was excellent.

A pair of spectacles would have obscured the unsightliness of the scar to a great extent. The tarsorrhaphy had preserved the eye as well as the most elaborate plastic done by a specialist accustomed to such work would have done. For this reason I think this case is worthy of record as these lesions are not uncommon in India and they almost certainly result in loss of the eye unless dealt with promptly. Such injuries must be very puzzling to those unaccustomed to deal with them, and it should be a great source of satisfaction to any practitioner who has had to watch an eye gradually going towards destruction from exposure to know that a good result may be obtained even in an extensive case by a simple method. I consider that tarsorrhaphy is one of the operations which all students of ophthalmology should learn and I invariably lay stress on it. There are numbers of conditions in which a timely tarsorrhaphy may save an eye. One has only to mention such examples as the lagophthalmos of leprosy, the keratitis after interference with the Gasserian ganglion, exposure of the cornea due to tumours of the orbit, and the cicatricial ectropion group as instanced above, to show the importance of mastering this simple piece of operative technique.

THE TREATMENT OF HEPATIC ABSCESSES OF AMŒBIC ORIGIN.*

By S. N. HAYES, F.R.C.S.,
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The object of this paper is twofold:—

1. To show that liver abscesses can be cured by emetine alone.
2. To suggest definite rules for their treatment.

Sir Leonard Rogers in his Lettsomian Lectures, reported in the *Lancet* of March 11th, 1922, p. 465 *et seq.*, gives a masterly statement of his researches. He states that single or multiple abscesses can be cured by simple drug treatment, and that abscesses can be converted into sterile encysted liver abscesses. He does not mention, nor can I find any mention in the literature at my disposal, the ultimate fate of these "cysts."

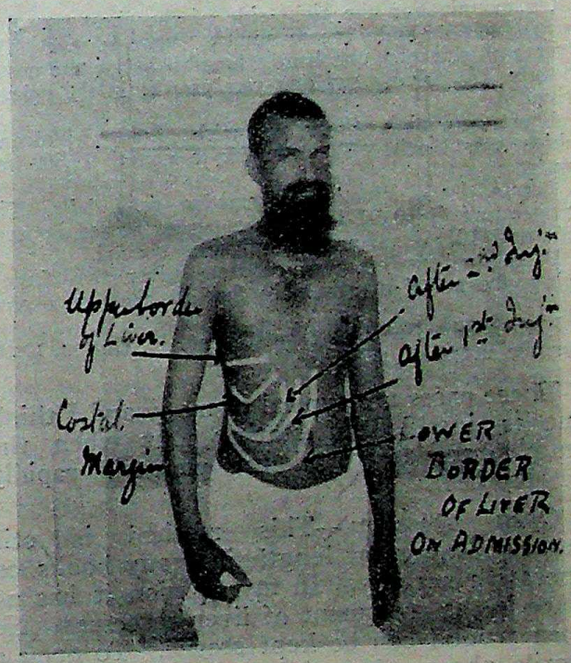
The indications for treatment given in the literature leave much to be desired, and I consider that we ought to be able to divide abscesses into classes, each of which would receive its own particular form of treatment.

My own interest in these cases was aroused two years ago by not being able to operate on a case, and ordering emetine injections instead. To my surprise the man recovered and left hospital quite well. Since then I have only aspirated and opened abscesses for the purposes of demonstration, and have come to the conclusion that the large majority of abscesses can be cured by drug treatment alone.

There are certain facts regarding liver abscesses to be kept in mind:—

1. That 75 per cent of them are sterile.
2. That of the remainder, many contain organisms of very low virulence.
3. Emetine is a specific for *Entamœba histolytica.*
4. Abscesses may be single or multiple; the latter I believe to be far commoner than one imagines.

The present methods of treatment are:—Emetine injections, plus (1) open operation; (2) siphon drainage; (3) aspiration; followed by a course of bismuth emetine iodide.



Emetine Injections.—The important question is:—What is the actual power of emetine on a liver abscess? We know it kills the amœbæ and causes encystment of the pus, but what happens afterwards?

The following cases provide the answer and Case 1 definitely shows that the cyst will be absorbed and that the clinical result is excellent.

Case 1.—A. S., aged 35, mendicant. Admitted 4th August 1926; discharged 8th September 1926. Complained of fever and swelling in the abdomen, of 1½

* Being an abstract of a paper read before the Patna Medical Society on October 29th, 1926.

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months' duration. Great pain in the right side. Pain on pressure over the liver. Temperature 98.4° to 102°F., pulse 100. Blood count—W. B. Cs. 12,000.

Treatment.—Emetine gr. 1 daily for 8 days.

The temperature became normal after the second injection. All pains disappeared. On August 13th and 14th the temperature rose to 101°F.; after that it was normal throughout. A second course of 8 injections was given from 1st September 1926. He was fit for discharge after the first course, but was kept in hospital for observation. Although on discharge his liver was easily palpable (*vide* photo), at the time of writing, 21 days after discharge, it was not palpable.

This case is the only one which I have been able to follow up. There is no doubt that he had an enormous abscess, neither is there any doubt that at the present time his liver is not palpable. It would be difficult to say from his present condition that he had suffered from liver abscess.

Case 2.—D. C., Hindu shopkeeper, aged 40. Admitted 21st August 1926; discharged 27th September 1926. Complained of dysentery, cough, and pain on the right side. Liver enlarged 4 inches below the costal margin. Given 8 injections of emetine, gr. 1 daily. Discharged at patient's own request on 27th September 1926, the liver on that day being 1½ inches below the costal margin.

Case 3.—S. S., Hindu cultivator, aged 28. Admitted 1st September 1926; discharged 18th September 1926. Admitted to the medical wards for treatment of cough and pleurisy. Complained that about 10 days previously he commenced coughing. Also complained of pain in the chest when breathing, and pain in the abdomen after defæcation. General condition emaciated. Was unable to lie down in bed owing to the difficulty in breathing. Was generally found leaning against the wall.

On examination the right side of the chest was dull on percussion and breath sounds were absent. The liver was enlarged one hand's breadth below the costal margin. A bulging swelling was present in the epigastrium.

Chest aspirated. Clear yellowish fluid withdrawn which was sterile. Total leucocyte count, 12,500 per cm.

Treated by 12 injections of emetine, gr. 1 daily. The temperature from 1st to 13th September varied between 98° and 101°F., after which it was normal.

Discharged at his own request. Liver two fingers below the costal margin. No fluid in chest on aspiration.

I am indebted to Lieutenant-Colonel H. Dutton, I.M.S., for the notes of this case.

These cases are typical of many and I think one is justified in stating that when the amœbæ are destroyed the pus will rapidly be absorbed.

Open operation.—This method is still described at great length in many books on operative surgery. In my opinion it has no place in the treatment of liver abscesses. No open wound can be kept sterile. To open a sterile abscess knowing that the cavity will become infected is an operation incompatible with present day knowledge. Its place is taken by—

Siphon drainage.—This means drainage through a tube from the abscess to a bottle containing antiseptic fluid which covers the end of the tube. The bottle is placed lower than the abscess.

The indications for its use are those abscesses which resist other methods of treatment, i.e., infected abscesses, and those in which aspiration has failed to evacuate the pus.

Aspiration.—This is the method advocated by Rogers and the one which is mostly used at the present time. Surgically it is ideal. It empties the abscess whilst emetine kills the causative organism. But for multiple abscesses it is useless (as is any form of operation). In many cases the pus will not flow through the cannula. Nowadays abscesses of a large size are uncommon. The literature of the past was filled with 50 oz. abscesses, and 5 oz. was an uncommon size. Now the positions are reversed.

Case 1 shows the result of emetine alone in a very large abscess. Why then use any other method in a smaller abscess? Aspiration of large abscesses is easy and safe, but in the case of small abscesses it is an operation requiring a knowledge of the anatomy of the abdomen and thorax which is not possessed by all.

It is reasonable to assume that a liver enlarged two-finger breadths below the costal margin can be reduced by emetine alone, and this is actually my own experience.

The method of measuring by fingers serves as a rough guide for treatment.

One can then conclude as follows:—All abscesses enlarging the liver less than two-finger breadths below the costal margin may be treated by emetine alone; those more than two-finger breadths by emetine plus aspiration. There will naturally be a large number of border line cases with such a rough indication and I think that you will find that you will tend to use aspiration less and less, and only use it in those cases (1) in which you feel definite fluctuation; (2) which resist emetine alone; (3) which extend more than a hand's breadth below the costal margin.

Summary of Treatment.

1. For all cases with the liver enlarged up to two-finger breadths below the costal margin—emetine injections alone. I give two courses of gr. 1 daily for 8 days, with an interval of one week between. After the first course the patients are usually well enough to attend as outpatients.
2. For cases with a greater enlargement or a definite fluctuating swelling, or resisting emetine alone—emetine plus aspiration.
3. For cases not responding to the above—emetine plus siphon drainage.

All patients should follow this up by a course of emetine bismuth iodide gr. 3 daily for 12 days.

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INJURIES OF THE KNEE-JOINT.

By SIR JAMES R. ROBERTS, C.I.E., M.B., M.S., F.R.C.S. (Eng.),

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Important Anatomical Points.—The bones concerned are the lower end of the femur with its deep intercondylar notch; the upper end of the tibia with its spine, to which are attached the crucial ligaments; the upper end of the fibula, its articulation with the tibia and the insertion of the biceps tendon; the patella with its relation to the quadriceps tendon and its smooth posterior surface.

Ligaments.—These are the capsular, external and internal lateral, ligamentum patellæ, crucial ligaments preventing anterior and posterior movements of one bone on the other, but permitting of flexion and extension, and when the knee is flexed at a right angle allowing of a certain amount of rotation. This rotation is important to remember as will be shown later; it should be produced in the normal subject in order to familiarise oneself with the amount.

The *semi-lunar cartilages* are attached by their outer margins, free internally, with narrow anterior corners and broad bulbous-like posterior corners.

Tendons.—Those of the biceps and semi-membranosus muscles—with bursæ, often communicating with the joint; the tendon of the quadriceps and ligamentum patellæ—with bursa—lie under the latter.

The synovial membrane on a basis of fibrous tissue affords a lining to the joint, and is reinforced in front by pads of fat on either side of the patella; these pads project so as to fill up the spaces left by the rounded ends of the two articulating bones.

It is not proposed to deal with fractures into the knee-joint.

Injuries and methods of production.—It is important to ascertain the manner in which the injury has been produced, and the patient must be most carefully questioned, as an obscure point in the exact diagnosis may often be cleared up by this means. Thus:—Was the joint in a position of extreme extension and then twisted, or was it semiflexed and twisted? The twisting is more often produced by the weight of the body thrown to one side or the other, as when a football player is borne to the ground with the knee in extreme flexion and the body twisted round.

Wrenches in which strain is put on the external or internal lateral ligaments cause tearing of these. In twisting movements strain is especially put on the crucial ligaments and on the external attachments of the semi-lunar cartilages.

Method of examination.—Note the gait of the patient; does he walk on the toes of the injured limb because the joint is painful in extension, or cannot be extended; or is the joint locked and the patient unable to put the foot to the ground? Examine the patient by placing him prone on a full-length couch, with both legs exposed for the purposes of comparison. Note the amount of swelling and "traumatic effusion" into the joint; fluid in the joint can be delicately ascertained by the floating patella test, i.e., fixing the quadriceps tendon with the left hand, and placing the tips of the fingers of the right hand on the patella; then by a series of sharp pressures feel whether the patella lies directly on the bone, or is separated from it by a layer of fluid. This must be practised by a beginner on normal joints in order to gain familiarity.

It is most important to test the extension of the joint, and whether it can be forced back to extreme extension as in the opposite limb, and whether if this can be done, it is painful or not. Knees with unrelieved derangements cannot be completely extended. In order to do the test, put a pillow under the patient's heels so as to raise the knees, leaving a space between them and the couch. With one hand on each knee force both backwards, and compare the two, watching the patient for signs of pain. *Another method* of testing the extension is to place two chairs side by side at a distance of 18 inches apart. The surgeon sits on one and the patient on the other; the latter then turns half left and places both limbs on the surgeon's lap, leaving the knees unsupported between the chairs, when the test for complete extension can be carried out. There are important decisions to be made by the surgeon on this test, e.g., whether the joint is cured, and what amount of exercise or games the patient is to be allowed.

This is the place to make a remark on the subject of "synovitis"; this term should be relegated to cases of arthritis, and not to injury. In these latter it is proper to describe the swelling as due to "traumatic effusion," not synovitis.

The test for antero-posterior mobility in cases of complete rupture of the crucial ligaments can be made as follows:—The patient being seated on a chair, the surgeon grasps the thigh with one hand, and curls his other hand and arm round the leg, so as to bring his wrist upon the upper calf, he then pulls the leg backwards and forwards, and notices whether the tibia is movable on the femur or not. If not, the crucial ligaments are intact.

Injury to the External Lateral Ligaments.—This is the less common, but is often associated with fracture of the head of the fibula, below the attachment of the tendon of the biceps; ascertain this point. Injury to the external lateral ligament gives rise to

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local tenderness and may be followed by a cystic condition of the bursa connected with the biceps tendon. This bursa may connect directly with the joint. An ununited fracture, which is likely to occur, if overlooked, can be treated by open operation; freshening the two fractured surfaces, turning down a strip of the vastus externus tendon, but leaving it attached at its lower end; vertically drilling the head of the fibula, threading the tendon strip through this; then drilling the shaft for three-fourths of an inch or so, and making a side connecting hole through the wall of the shaft. Along this curved passage the strip is made to pass and tied above the head of the fibula to the tendon there.

Injury to the Internal Lateral Ligament.—Injuries to this ligament are not uncommon, especially since ski-ing became popular, and can be diagnosed by the swelling and seat of pain, the mobility produced and the traumatic effusion. Complete extension of the knee-joint is painful and even impossible. It is important to remember in connection with this injury that trauma is inflicted on muscle attachments and that effusion occurs above the internal condyle of the femur. In common with injuries to muscle attachments near joints—such as the brachialis anticus—ossification is likely to take place, and a protracted convalescence ensues, only to be hastened by removal of the osseous deposit. Thus injury to muscles near a joint produces the so-called "myositis ossificans." It stands to reason that early massage of the swelling after injury to the internal lateral ligament can only make matters worse, and it is only after prolonged rest, when recovery has set in that a little final massage can be tried. Here it is that *x*-rays prove their value in demonstrating this bony condition, deposits of which can take place both in the injured lateral ligament and above the internal condyle of the femur.

Fracture of the spine of the tibia.—The fractured spine takes with it the attachments of the crucial ligaments, and is an example of how bone often gives before ligaments. The diagnosis is easy owing to the mobility; but the differential diagnosis between this and ligament rupture is dependent on an *x*-ray photo. The treatment is prolonged rest in easy flexion, for if the knee is kept extended the spine is drawn from its head by the crucial ligaments.

Rupture of the crucial ligaments is usually associated with so severe an injury that the whole complex will require careful and well thought out treatment by position, rest and apparatus.

Injuries of the semi-lunar cartilages.—It is to be remembered that these structures are narrow at their anterior ends and broader and bulb-like at their posterior ends, and are attached to the capsule and bone along their outer margins. Dislocation of these cartilages means a splitting along the outer margin leaving the anterior and posterior ends intact and fixed; or it may be that either the anterior or posterior end becomes detached. In the first case a strap, as it were, is free—though attached in front and behind—to move between the articular surfaces, or to be pushed into the intercondylar notch of the femur. Once in this position it may remain there and cause no more trouble, but usually it is displaced again into the joint cavity and locks the joint. Many cases of dislocated cartilage are cured by bone-setters' manipulations; this is due to their having succeeded in forcing the cartilage up into the notch.

The signs of dislocated cartilage are locking of the joint, interference with expansion, and sometimes a history of previous replacement by efforts on the part of the patient. With the original dislocation effusion is marked, more so than in the subsequent ones. The patient complains of intense pain at the time of the displacement, and tenderness over the attachment of the cartilage. It is not always the case that external cartilage dislocation can be differentiated from internal, as injury to the former may also give rise to pain internal to the patella, though as a rule the discovery of tender spots on either side of the patella gives the clue.

The treatment of displaced cartilage is either by manipulation or operation. Here one may refer to immediate treatment or first aid. Thus were one present at a football match, where a player injures his knee, proceed as follows:—lay the patient on his back; seize the limb by the ankle or foot; bend the limb to a right angle and rotate the tibia on the femur from side to side, not once but many times in succession. This is almost certain to replace the cartilage from between the bones, and is to be followed by extension. If this can be done the rotation has been successful; if not, try again; but if unsuccessful it is a case for *x*-rays and probably operation. After reduction the treatment is one of fixation, rest, etc., remembering that the cartilage will take some time to regain its firm attachment. Should this not be accomplished the case is then one for operation.

Cartilage injury.—For some unaccountable reason, a piece of articular cartilage covering the femur, tibia or patella may become separated and form a loose body. An erosion is left behind at the site of detachment. This injury is difficult of diagnosis, as the symptoms are milder, the disability only feebly crippling to the patient, unless a large loose body catches between the femur and tibia. Such cases are only cured by operation. Removal of the body can be done, but it is important to examine the articular surfaces in order to discover the pit, and if its edges

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are undermined to cut away these—bevelling them as it were.

Synovial membrane fringes.—These fringes hypertrophy, and the edges get nipped between the bones, or cartilaginous and osseous nodules form in the fringes, subsequently to be detached and form "loose bodies" in the joint. These cases are generally over 30 years of age. Some persons have permanently creaking knee-joints and crepitus can be felt by a hand placed on the joint while it is being flexed and extended. Nipping of a fringe is followed by traumatic effusion if not relieved and prolonged treatment is required. The accident is sudden and painful, and the patient comes into the surgeon's room limping on the toes of the injured side. The movements made in walking, jumping, playing tennis, etc., are the direct causes. The fringe when nipped requires to be freed—the sooner the better. This is done by rotation from side to side when the knee is bent at a right angle, as previously described. The relief is immediate and a bandage should be worn for a few days to support the joint. The patient can be instructed in the manipulation of replacement to meet a future occasion.

Enlargements of the bursæ of the biceps and semi-membranosus tendons are likely to communicate with the joint. For the first treatment simply evacuate; if it refills dissect it out; if again unsuccessful the joint requires to be opened and the synovial membrane in the vicinity examined, and if diseased scraped away.

Supervention of malignant disease after injury.—In young persons it is important to remember that an injury to the knee-joint may be the starting cause—though this is rare—of a sarcoma of the lower end of the femur or tibia. A patient after prolonged treatment without improvement, is dissatisfied, sees another surgeon who *x*-rays the limb and makes the diagnosis. Non-diagnosis of malignant disease in its early stage is a serious matter and emphasises the necessity of an *x*-ray photo in all cases that are obscure, or who do not begin to improve from the first.

Supervention of tuberculous disease after injury.—This is another important contingency to be remembered, and the importance of an *x*-ray examination is here again emphasized.

This paper is not one dealing with arthritis; but it is to be remembered that pain down the inner side of the head of the tibia points to arthritis, and to bear in mind the association of pain in the knee with hip disease.

Operation on the knee-joint.—A vertical incision through the skin and capsule is better than an L-shaped one, lest the capsular ligament be injured in the horizontal incision of the L. The capsular incision should not be placed immediately under the skin incision, for fear lest the buried sutures of the capsule make contact with those of the skin and a channel for infection be created. As many as three incisions can be made if found necessary. The first in front, to explore the anterior portion of the semi-lunar cartilage; if this is intact then a posterior incision is made to deal with that portion of the cartilage. Put up the limb in a slightly flexed position, and on removal of the stitches allow the patient to get up. Within a fortnight allow him to discard a splint and move about the house, giving massage to the muscles in order that they may retain their tone, and so be prepared to protect the joint. These cases do not require a long convalescence. To split the patella vertically in order to expose the joint is barbarous surgery, as chronic disability is so apt to be left behind. Hæmorrhage into the knee-joint owing to injury or operation can be recognised by a rise of temperature. In knee surgery there is no margin except for the strictest aseptic surgery, as there is no more vascular part of the human anatomy.

BERIBERI: ITS SYMPTOMS AND TREATMENT.

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SYMPTOMS.

Dry Beriberi.—This form usually begins with some burning in the stomach, and tingling in the legs and feet and sometimes in the hands. After one or two days pains occur in the legs, at first being only slight, but becoming quite annoying within three or four days. The calf muscles are especially painful. The tingling gradually increases in intensity and also spreads over a greater area, affecting the hands and arms. The tingling is most intense in the soles of the feet and in the palms of the hands. Sometimes it is also intense in the lower abdomen, and some patients complain of a tingling sensation in the tongue. The pains in the abdomen increase and there is a sensation of tightness around the waist, as though a band or belt was tied tightly. Along with the tingling in the legs, there is a considerable amount of tightness in the muscles of the thighs, causing a feeling as though cords were pulling when the legs are stretched out straight.

On pressing on the calf of the legs considerable tenderness is complained of, and there is usually a slight amount of œdema over the shins. The feet are also swollen in the more severe stages of the disease. As the disease progresses the patient becomes very weak, and cannot rise from a sitting

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position without the aid of a stick or by pulling on a chair. This weakness in the legs increases until there is a paralysis of the muscles. This is especially marked in the leg below the knee, and the toes or foot cannot be moved voluntarily. There is usually shortness of breath upon slight exertion, and throbbing in the chest is marked and easily visible in the advanced stages of the disease.

In the last stages of the disease there is a marked difficulty in breathing, the breathing being very rapid, and the throbbing over the heart being very noticeable. The urine is usually not affected until the last stages, when it becomes very scanty. This is usually just before death.

Wet Beriberi.—The symptoms of this form of the disease may be so vastly different from the dry form that an inexperienced observer would not recognise them as being the same disease. The most marked symptom is swelling. This may begin in the feet and extend to the whole of the body. The legs and abdomen, face and arms may be bloated to twice the normal size, and the patient be unable to move because of the great weight of his body. The tingling and pains that are so characteristic of the dry form of beriberi may be entirely absent in this form, or they may be very mild and give no trouble to the patient. The heart may be affected so that the breathing is very rapid and short. The urine may be less in amount than usual.

Progress of the Disease.

In either form of this disease the progress may cease at any point and gradually improve; or what is more common, the disease will cease to progress and remain at the same stage, neither improving nor getting worse for some time. In the dry form it may become chronic in nature, and then the muscles of the legs waste away until the calf muscles are no larger than the ankles. The arms may also be wasted, and the patient be little more than a skeleton. The condition may change from one form to the other, i.e., the swelling may all disappear and be followed by wasting and paralysis; or the wasting may be followed by great swelling of the body.

Treatment.

I have followed the outline of treatment given below, and find that cases respond in about six to ten days' time. It is usually this length of time before there is any appreciable improvement in the symptoms, but as soon as improvement begins the symptoms rapidly improve. In the mild cases the patient may be entirely well in ten days. In the severe cases, where difficult breathing and paralysis occur, it may take one and a half to two months' treatment in order to effect a cure, and some of the tingling and pulling in the legs may last for three or more months, but usually six weeks will see all the symptoms disappear. The order of improvement may be expected to be as follows:—The tingling gradually becomes less and then the pains begin to lessen. The pain and burning in the abdomen disappear and the patient becomes quite comfortable. If there has been much difficult breathing, that will gradually lessen, and the swelling over the shins disappears. The pulling in the legs and the tightness in the abdomen are the last to pass away.

Treatment—Prophylactic or Preventive.—This is the most important. In places where beriberi is common, and where rice is the main article of diet, the people should be instructed to take more vegetables and fresh fruits, and to take a smaller quantity of chilli in their curry. I believe that the chilli kills the vitamines in the vegetables. All rice should be of the red or unmilled variety, and in addition some food product should be given to augment the vitamine content of the red rice. Marmite, a commercial extract of yeast, is recommended on p. 360 of Manson's *Tropical Diseases* as a prophylactic for beriberi, and I have used Marmite successfully for this purpose.

Treatment—Medical.—I give every patient Marmite. Patients are instructed to take a quarter of a teaspoonful (twenty grains) of Marmite every morning and evening, or, if they can afford it, three times a day. They mix it with a little water, and take it as medicine, or they spread it on bread, or mix it with their rice or *dhâl*. I do not allow them to mix it in curry, for I believe the vitamines would be destroyed in this way. Each patient within walking distance of the hospital is told to come each day for some rice bran infusion (tea). If they cannot come or send someone, they are instructed to make the rice bran tea as follows:—Take rice bran (rice polishings from the mill) sufficient to fill the hollow of the hand, heaped up, and add it to a half glass of cold water, and let it set overnight. In the morning strain the rice bran tea through a thin cloth, and take half of it then, and the other half at night. This must be made fresh daily as it sours very quickly. The rice bran tea can be sweetened with sugar if desired.

The patients who can afford it are put on to a vegetable diet, and are not allowed any rice whatever. They are given ground wheat twice a day as a cereal. They are urged to take fruit juices, and if they have no scruples against it, they are urged to eat eggs. The poor are allowed only red rice, and are not permitted to take any white rice at all. They cannot afford to take more vegetables, milk, or eggs, but they get along almost as well as those who can afford a better diet.

If there is any difficult breathing the patient should be confined to bed, and it is

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better to change the sleeping room if possible. There should be plenty of fresh air, and the room should be clean and light. Massage of the limbs in the paralytic cases is of value after the pains and tenderness have gone.

SUPPURATION OF THE MIDDLE EAR: ITS CAUSES, SYMPTOMS, DIAGNOSIS AND TREATMENT.

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ACUTE OTITIS.

AURAL suppuration, a very common condition, is the cause of an immense amount of ill health, disability and quite a considerable mortality. Statistical returns being what they are, deaths from the above cause are seldom returned as such in this country. The condition is readily curable by simple treatment in the early stages of acute otitis; hence the treatment of acute suppurative otitis is much more important than that of chronic otitis. When the disease has been allowed to run a chronic course, it becomes very obstinate and treatment is much more difficult. Even if the otitis be cured, a chronic adhesive process may be set up leading to progressive deafness.

For this reason every case of earache or of a child putting its hand continually to the ear and every case of unexplained pyrexia in a child should be carefully investigated, and the ear as well as the throat examined. A forehead mirror, different sizes of ear speculums (six would be ample) and a bright light are essential for this examination. A petrol lantern or even a kerosine reflector lamp is all that is required. Brunton's auroscope or electric auroscopes are not recommended.

I regret to have to observe that this branch of surgery is very little understood by the medical profession in this country, and ideas about the ear, nose, tonsils or adenoids appear to be vague. In this article details of special or difficult methods of treatment will not be discussed, and an effort will be made to standardise treatment as far as possible.

ACUTE OTITIS MEDIA.

Causes.—Any cause which facilitates the entry of organisms into the Eustachian tube and tympanic cavity and by obstructing the orifice favours their retention, predisposes to otitis media. Thus adenoids are the commonest predisposing cause. Amongst others are new growths in the naso-pharynx, suppuration of any of the accessory sinuses of the nose, a deviated septum, enlarged hypertrophied posterior tips of the inferior turbinals, etc.

The disease is a frequent accompaniment of the acute infective fevers such as scarlet fever, measles, influenza, or even of a common cold. It may occur after traumatic rupture of the tympanic membrane especially if neglected, or as a result of faulty technique in removing a foreign body from the external meatus. It may follow improper use of nasal douches or occur after an operation on the naso-pharynx such as removal of adenoids. Sea bathing and diving may bring on an attack.

Bacteriology.—The organisms most frequently found in acute otitis are the streptococci; *Micrococcus catarrhalis* or pneumococci are sometimes found. It is important to remember that acute otitis is a mono-bacterial infection and the organisms are found in pure culture. Staphylococci are never found in the beginning; they often constitute a secondary infection.

Streptococcus mucosus, a capsulated organism, is sometimes responsible for a very malignant variety of otitis. This variety of otitis will be described later.

Pathology.—In the early stages the inflammation is confined to the mucous membrane of the tympanum, and as a rule the mucous lining of the antrum and cells are also inflamed. The tympanic membrane next undergoes necrosis at one point and perforates. Pus escapes and under suitable conditions the ear heals perfectly. But more often secondary infection supervenes, the mono-bacterial becomes a poly-bacterial infection and the disease becomes a chronic one. The bones beneath the thin mucosa may undergo necrosis. If mastoid suppuration supervenes, the greater part of the mastoid may be necrosed and the infection may spread to the meninges and brain, to the lateral sinus, to the neck, to the labyrinth and facial nerve, etc.

Symptoms and Treatment.—Acute otitis may be conveniently divided into three stages:—

First stage.—The onset of pain is generally sudden, rapidly becoming severe. The pain is described as piercing, boring, or throbbing, radiating over the side of the head. The temperature ranges from 100° to 103°F. and in children may be 105°F. There is deafness, often pronounced, tinnitus or even vertigo. In adults, however, sometimes there may not be much pain or constitutional disturbance. In children symptoms are always much more severe. There is marked constitutional disturbance and the case may even simulate meningitis; restlessness and sleeplessness are marked and as physical examination is difficult, one has often to diagnose by symptoms alone.

The tympanic membrane is red, redness being most marked round the handle of the

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malleus and in Shrapnell's membrane. The short process of the malleus is still visible.

Treatment.—The point that should be always borne in mind in treating ear conditions is that the tympanic membrane is a highly sensitive structure and all manipulations should be gentle.

The ear should be cleaned of cerumen and debris, either by gentle syringing with warm 1 in 60 carbolic lotion or with cotton-wool swabs either dry or wrung out of alcohol. Instil half a teaspoonful of warm 5 per cent. carbolic glycerine, after which plug the external ear lightly with cotton-wool. After this, dry hot fomentations, with a hot salt or hot sand bag or a hot water bag should be applied. The patient may sleep on a hot water bag covered with flannel.

Carbolic glycerine 5 to 10 per cent. is a most excellent remedy—it renders the ear aseptic, relieves pain and causes dehydration. A couple of leeches, real or artificial, over the mastoid process gives immediate relief.

Second stage.—The whole of the membrane is red, velvety, swollen, and bulging, and covered with small white spots of desquamated epithelium. The landmarks, i.e., the handle and the short process, are no longer visible. At first the exudate behind the membrane is serous, and there may be some exudate in the external meatus as well although there is no perforation. This is an important point to remember, as when there is an exudate in the external ear one is liable to jump to the conclusion that there must be a perforation. When the secretion becomes purulent the colour of the drum becomes yellowish.

Treatment.—Immediate paracentesis or myringotomy. Sterilize the pinna and external ear with absolute alcohol or biniodide and spirit lotion. Take a myringotome, an old cataract knife held between the thumb and index finger, or even a big Hagedorn's needle held in a needle holder; pass the instrument through the speculum, and under inspection

the point is thrust into the most prominent bulging part of the drum, and the incision is prolonged up or downward as the case may be. The incision must be free, otherwise it will close up very soon, often after 24 hours.

It does not much matter where the membrane is incised so long as the handle is not injured, and the incision may be made either in front of or behind the handle, but very often the best drainage is obtained by incising behind. An anæsthetic is not necessary though most English text-books recommend a general anæsthetic.

Instil 5 per cent. carbolic glycerine after the blood and pus are wiped out and insert a thin gauze drain through the incision. Hot fomentations should be continued as before. The patient feels instant relief after this operation.

The gauze should be changed every 4 to 6 hours if possible, but in any case it must be changed after 24 hours but should not be re-inserted through the incision. If the wound heals before symptoms disappear, it may be necessary to do a paracentesis again.

These incisions heal rapidly, leaving a thin white scar. If the drum is incised even before there is suppuration no harm is done, whereas if the drum be left to perforate of itself it takes much longer to heal and the disease may become a chronic one. So the golden rule is, even when in doubt operate. Pus is seldom profuse after myringotomy. As a rule there is just a streak of pus in the hæmorrhage that follows. Syringing is better avoided at this stage.

Third stage.—The drum gives way and perforates. The discharge which is at first thick and purulent becomes muco-purulent. At this stage there is little or no pain, but the patient complains of deafness, feeling of fullness, noises and pulsation in the ear. The discharge lasts for about a month, after which, under favourable conditions, it may dry up. The perforation may close but deafness, fullness, the noises in the ear persist. On examination the perforation may not be always visible but a pulsating collection of fluid at the lower margin of the drum is pathognomonic. If still doubtful inflation may be tried—a hissing sound would be heard in case of perforation—or the patient may be told to close his mouth, pinch his nose, and then blow. Fluid and bubbles would be seen coming through the perforation.

Treatment.—It is at this stage that the mono-bacterial becomes a poly-bacterial infection and the acute otitis tends to pass into a chronic one. If the discharge be slight do not syringe the ear. Clean the ear with cotton-wool swabs soaked in alcohol or hydrogen peroxide. Then fill the ear with hydrogen peroxide, let it bubble, then dry the ear, and pour in 10 drops of boric alcohol (gr. viii to gr. xv in one ounce of alcohol, 70 per cent.); then insert a light cotton-wool plug or preferably a small piece of sterile gauze. If the discharge be profuse or foul the ear should be syringed through a Hartmann's

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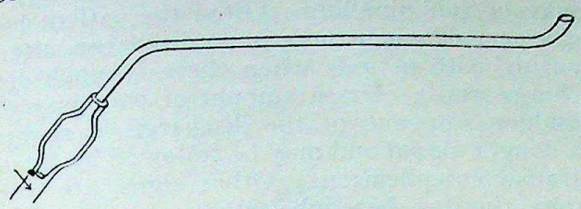
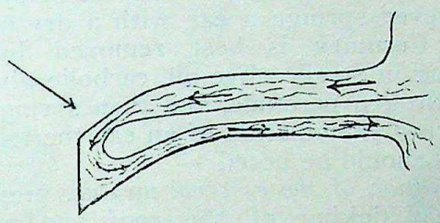
cannula. The cannula is attached by means of rubber tubing to a metal ear syringe.

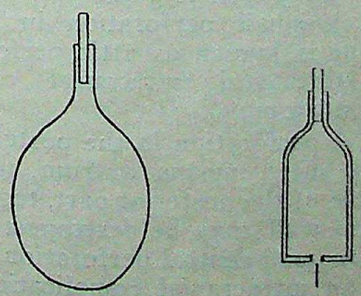


This is a safe way of syringing the ear. If this instrument is not available, an ordinary ear syringe may be used, but the fluid should be directed to impinge on the superior or postero-superior wall of the external meatus and not on the drum. Force should never be used.



The fluid will then scour the surface and inferior angle of the drum and will not get into the tympanum. This point should always be remembered while syringing the ear. After syringing, the ear should be treated with hydrogen peroxide and alcohol as described before. Care should be taken to prevent external otitis by touching the external meatus every other day with 5 per cent. silver nitrate solution and then covering the surface with sterile vaseline. If pain and temperature persist for more than two weeks after myringotomy or perforation, and if there is tenderness over the mastoid, the antrum and cells should be opened and drained. But I cannot advise all and sundry to undertake this operation—doubtless it is a simple operation, but still it must be performed by a trained surgeon.

If the discharge persists and if there is no obvious obstruction at the Eustachian orifice, inflation should be tried. The simplest way to use the Politzer bag is as follows:—



Make the patient take a mouthful of water. Insert the vulcanite piece, protected with cotton-wool or rubber tubing, to that side of the nose, the ear on which side it is intended to inflate, i.e., to the right side of the nose if the right ear is to be inflated. Ask the patient to swallow, and as he does so press the bag. Politzerisation should not be done oftener than thrice a week.

After the acute symptoms subside any predisposing cause such as adenoids must be removed. Many of my young patients' ears heal without any further treatment once the adenoids and tonsils are removed. The parents seem to have an idea that once the child has been operated on further treatment is superfluous, so they are not brought to my clinic any more, but occasionally I get hold of some of my old patients and find the ear more or less normal.

Diagnosis:—From furunculosis. In this disease the external meatus, pinna, and the skin covering the mastoid may be red and œdematous and one is liable to diagnose acute otitis. The furuncle generally occludes the external meatus and the drum is not visible. In eczema there may be a serous exudate, but the external meatal wall is covered with crusts and alcohol causes severe burning. Both in furuncle and eczema manipulations of the pinna are painful, and gentle tapping of the tip of the tragus with the tip of the index finger causes intolerable pain. This is pathognomonic.

In conclusion I wish to impress on my readers that a velvety red bulging drum must be incised. You will never regret doing so, and you will save a lot of suffering and chronic ill health and at least some lives. If you make a mistake and find no pus, you need not be ashamed; you have done no harm, on the contrary you have very probably done a lot of good. The case will resolve quicker. Do not be disappointed if you do not see much pus—it is generally just a streak in the blood. Paracentesis is even more often indicated in children than in adults, so even when in doubt incise. The operation is practically without danger—but remember to have the head held firmly, otherwise the labyrinth may be injured.

Cases of acute otitis seldom come to the specialist; the general practitioner is the person who treats them and he can do an immense lot of good by recognising the disease and treating it properly at the early stages.

I shall describe one illustrative case to show the excellent results of paracentesis:—

A young Hindu, male, aged 20 years, came to my ear clinic on a Monday. Acute otitis was diagnosed, but as it was one of my very busy days I asked the man to come on the following day. Glycerine carbolic drops and fomentations were ordered. The man did not come on the following day. On Wednesday I was asked to see a case of pneumonia. The patient was delirious and had a temperature of 105°F. His face was very red and flushed. There was only a small patch in front of the lower lobe of the right lung, and some diminution of breath sounds around this area. There was nothing to make one suspect any ear trouble. On Thursday the temperature was still 105°F., the head

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was retracted and there was twitching of the fingers. The threatened meningitis made me look at his ears and the right drum was found to be intensely red and bulging. It was then that I recognised my patient of Monday before. Paracentesis was performed within an hour, and the temperature was 101°F. on Friday morning and normal by Saturday. I saw the patient a month later; the drum was perfectly healed. The patient complained of a feeling of fullness and heaviness in the ear. Catheterization of the Eustachian tube and inflation put this right also. But for timely paracentesis the patient would most probably have died either of meningitis or pneumonia.

MUCOUS OTITIS.

This is caused by the *Streptococcus mucosus*, a capsulated coccus, and may be described as a sub-acute but virulent form of otitis. The symptoms are slight pain, slight discharge which is not always present, as it dries up now and again; poor hearing, not improved by inflation; the drum is greyish-red, thickened, no longer translucent, the details are visible but vague. The disease gives rise to formation of a soft variety of connective tissue which fills the tympanic cavity and antrum and permeates the cells and causes wide destruction of bone. Unless eradicated in time by a thorough radical mastoid operation the disease pursues its relentless course and the patient eventually dies of some intracranial complication.

CHRONIC OTITIS.

In most cases chronic otitis supervenes upon acute otitis because of the persistence of the predisposing cause and perhaps also as a result of the mono-microbic becoming a poly-microbic infection. Hence the importance of keeping the external meatus clean and aseptic before the drum perforates or before paracentesis is done. Sometimes the disease is chronic from the outset, as in tubercular otitis or in cases in which, owing to a developmental defect, remains of the jelly-like substance filling the tympanic cavity of the fœtus persist and give rise to a chronic otitis. Cholesteatoma may be primary (Ruttin) and may start as a chronic otitis, but in most cases the condition is secondary to a marginal perforation. As already stated the mucous lining is at first affected in suppurative otitis, later infection spreads to the ossicles and bony wall. Of the ossicles the incus is the one most often affected. Granulations and polypi appear and the tympanum becomes honeycombed with pus-secreting cavities. Infection spreads to the antrum and mastoid cells, may spread to the labyrinth, to the meninges and brain, to the lateral sinus. The facial nerve may be affected in several ways. The mastoid abscess may open into the tissues of the neck, giving rise to von Bezold's abscess. The perforation of course persists or even enlarges.

The *symptom* for which the patient seeks advice is either (*a*) loss of hearing, which may be slight or in the old cases may be very great, or (*b*) discharge from the ear, which is variable. It may be profuse or scanty, it may be foul smelling. Often the patient has dry periods when there is no discharge, alternating with periods when there is much discharge and a certain amount of pain as well. Sudden stoppage of the discharge is always a danger signal and may be followed by intracranial complications. Other signs are vertigo, tinnitus, headache, etc.

Examination of the Ear.—The practitioner should be familiar with the normal appearance of the tympanic membrane. Pus, crusts, epithelial debris, cerumen must be removed by means of cotton-wool swabs held with a pair of aural forceps. If the meatus is full of foul discharge it should be syringed, but never syringe a ear with a dry perforation. Cerumen is best removed by first soaking in sterile olive oil, carbolic glycerine, or hydrogen peroxide, and then syringing.

During examination of an ear the following points should be noted:—

Condition of the external meatus: presence of eczema, sinking of the roof and postero-superior wall of the bony meatus, which means antrum suppuration.

The membrana tympani.—First determine whether it is present or absent; this may sound ridiculous but it is a fact that even otologists cannot make up their mind on this point after inspection alone. Next note its colour, landmarks, and general appearance. Note the presence or absence of granulations and polypi. Lastly, carefully examine the perforation, noting its size, shape, situation, edges, whether single or multiple. A perforation may be hidden by polypi.

Perforations may be classified according to their position:—

(*i*) If situated in front of the handle of the malleus the perforation is due to Eustachian tube suppuration. These cases though harmless are very obstinate and are liable to recurrence even if they heal up.

(*ii*) If large and kidney-shaped and situated below the handle, it is known as meso-tympanic, and this type is the easiest of all to cure. Prognosis is good.

(*iii*) A small perforation in Shrapnell's membrane is known as attic perforation. It means threatened intracranial complications or cholesteatoma.

(*iv*) A perforation in the postero-superior quadrant often means antrum suppuration. The whole of the posterior part, together with the antral wall, may be destroyed.

(*v*) A small central perforation very often ends in an intracranial complication, especially sinus thrombosis (Neumann).

(*vi*) A marginal perforation is often a sign of cholesteatoma.

(*vii*) More than one perforation, especially if small, often indicates tubercular disease.

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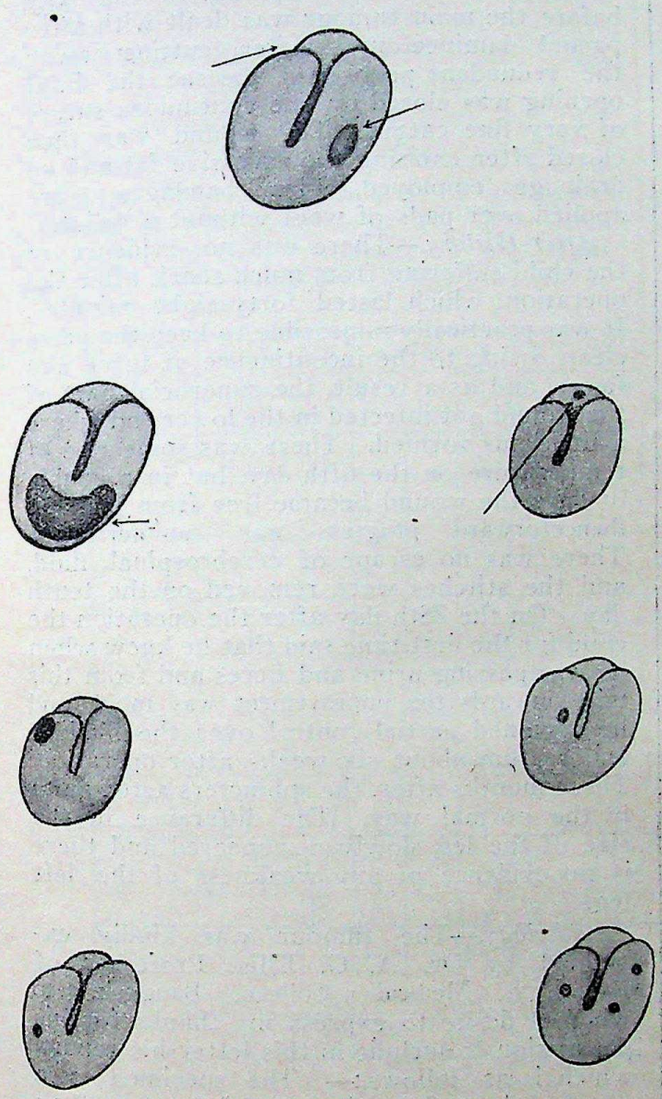
Treatment.—In uncomplicated cases the following routine treatment will suffice. Clean the ear with cotton-wool swabs soaked in alcohol or hydrogen peroxide. Then pour about half a teaspoonful of hydrogen peroxide into the ear while the head is so held that the affected ear points upwards. Let the hydrogen peroxide bubble, and when bubbling ceases pour out the fluid. Dry the ear with cotton-wool, and pour in 10 minims of boric alcohol (boric acid gr. x to xv to 70 per cent. alcohol, 1 oz.). If this causes smarting use alcohol diluted with an equal part of distilled water.



If the discharge is profuse or foul, syringe before the hydrogen peroxide and boric alcohol is instilled. One should however bear in mind that too much syringing is bad, and many cases start healing as soon as syringing is stopped. Considerable patience is needed in the treatment of these cases, and treatment may have to be continued for a year or more before healing occurs. Granulations should be touched with a 10 to 25 per cent. solution of silver nitrate or with trichloracetic acid fused on a probe. Polypi have to be removed with an aural snare or a pair of forceps.

The predisposing cause should be determined. Thus in children adenoids and tonsils have often to be removed. Scraping the surface of the adenoids or cutting a section of the tonsils is worse than useless. The whole bunch of adenoids should be removed and the tonsils enucleated. For this the patient should be sent to one of the ear, nose and throat clinics.

In adults septic conditions in the nose and naso-pharnx should be treated. The commonest conditions are suppuration of one of the accessory sinuses; nasal polypi; deviated septum; enlarged posterior tips and remains of adenoid growths, or even septic tonsils. Even when a cure is not expected hydrogen peroxide and alcohol treatment will prevent recurrent attacks of acute exacerbations and often prevent further damage. Politzerisation once or twice a week drives out accumulated discharges in the tube and tympanum.

Suppuration of the antrum is the commonest complication of otitis and very often the middle ear cannot heal on account of this.

Indications for, and a description of, the radical and conservative mastoid operations hardly come under the scope of this article and need not be discussed here.

CHOLESTEATOMA.

This is a chronic but rather a malignant variety of chronic otitis. A cholesteatoma is an overgrowth of epidermal tissue which passes inside into the tympanic cavity through a marginal perforation. The growth continues, invading the antrum, cells, Haversian canals in the bone, and finally produces intracranial complications. The discharge is very foul. The ear is full of whitish, cheesy matter and in the later stages the destruction of bone may be extensive. In one case that came under my treatment there was a large cavity behind the ear, the size of which was bigger than that of a golf ball. The lateral sinus, the dura covering the temporo-sphenoidal lobe and the cerebellum were exposed. These patients should be operated on before it is too late.

A Mirror of Hospital Practice.

A CASE OF FIBRONEUROMA OF THE CAUDA EQUINA.

By FRANCIS CHRISTIAN, M.R.C.S., L.R.C.P. L.M.,
Surgeon, Vajira Hospital, Bangkok.

TUMOURS of the cauda equina are so exceptional that I think the case of a boy that passed through my hands merits publication.

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Seng, a Siamese boy of 6 years was admitted to the Vajira Hospital, Bangkok, in May 1925. The parents gave the following history. The boy was normal until he was over two years old, when for the first time they noticed that he was losing control over the bladder and rectum. Slowly this became more marked and it was obvious to them that he was quite insensitive as to the escape of urine and fæces. This incontinence became more pronounced as he grew older. About the same time they noticed a slight rounded prominence in the middle line above the level of the upper end of the sacrum about the size of a small cherry, which gradually grew, and at the time of admission it was as big as a small hen's egg cut longitudinally in half, the broader end being below.

His left leg was slightly weaker and half to three-quarters of an inch smaller in girth than the right leg. The muscles were not so well developed in the left leg. It was difficult to mark out the areas of loss of epicritic and protopathic sensation, but apparently these were diminished on the posterior aspect of the left thigh, and superficial pain also was diminished in the same area. There was pain on pressure over the left sciatic nerve. The distribution of pain and sensory disturbance could not be marked out definitely owing to the child getting into a fright on the mere approach of any of the responsible members of the staff. The mucous membranes of the urethra and rectum were insensitive. The swelling did not appear to become appreciably tenser when the child cried.

The condition was diagnosed as a case of meningo-myelocele with possible involvement of the cauda equina and certain sacral roots.

Operation.—An incision was made over the tumour along the middle line, and on cutting deeper the bulk of the tumour was found to consist of a firm thick layer of fat, whilst the sac itself was very small indeed compared with the size of the tumour. There was a lozenge-shaped space between the spines of the last two lumbar and the first sacral vertebræ through which the spinal meninges protruded a little. On opening the sac a slight dilatation of the spinal canal was seen in the area and the laminæ of the vertebræ mentioned above were somewhat defective at this level. There was some escape of cerebro-spinal fluid which was controlled with difficulty, and on clearing the field the leech-shaped tumour of the cauda equina, with its head below and gradually tapering upwards, came into view in addition to five nerve filaments, three on the right and two on the left of the tumour. The head of the tumour which was quite hard was found attached to the lower part of the sac, but the body was freely movable in the subdural space and the tail was attached above. The tumour was freed from its lower attachment first and on pulling it down the tail end was found fixed to the dura, in addition to its attachment above, as well as to some nerve filaments, and it was then separated from its attachments. The five nerve filaments were attached to the sac by their lower ends, and these were freed and kept out of the way before the main tumour was dealt with after partial laminectomy. After cutting away the redundant portion of the sac, the dural opening was closed by one continuous suture of very fine catgut. The wound was then closed after excising the excessive fat and no drainage employed. Firm bandages were applied over pads of wool without a splint.

After-History.—There was no evidence of the child suffering from much shock after the operation, which lasted forty-eight minutes. It was practically impossible to keep the parts clean owing to the incontinence of urine and fæces, and as a result, the superficial part of the wound got infected in the lower end where a little pus formed. There was some rise of temperature on the fifth day, but in a couple of days the wound became free from pus and thenceforward progress was uninterrupted. There was no escape of cerebrospinal fluid, and the stitches were removed on the tenth day. On the 28th day after the operation the child for the first time said that he knew when he was passing urine and fæces and from this time onwards the improvement was rapid, and he regained partial control over the bladder and rectum about six weeks after operation. Three months after, the sphincters acted quite in the normal way. The difference in the size of the leg slowly disappeared and there is no evidence of any weakness of the left leg.

Pathology.—The tumour was kindly examined by Dr. A. G. Ellis, Professor of Pathology, Medical College, Bangkok, to whom I desire to express my thanks for his permission to include in this letter his report, which is as follows:— The specimen is a mass of tissue 2 cm. long; slightly more than half of this is smooth, soft, red in colour, almost cylindrical in shape, and 0.6 cm. in diameter. The remainder is 0.8 cm. in diameter, has a rougher surface, is grey in colour, and fairly firm. Incision shows that the cylindrical part extends through most of the grey portion, the latter surrounding and distorting it. Sections of the smooth end of the specimen are partly of somewhat atypical white matter of a spinal cord. This is arranged as two lateral portions widely separated by fairly dense fibrous tissue containing scattered nerve fibres. These project like cornua and are partly bordered by thin membrane-like pia mater. The remainder of this part is partly neuroglia and cells but contains many small blood vessels, resembling a glioma more than it does spinal cord.

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Sections through the large end of the specimen are chiefly of dense fibrous tissue in irregular bundles containing numerous nerve fibres. Among these are scattered areas of spinal or neurogliar tissue like that of the upper end. Diagnosis—pathological—a fibroneuromatous new growth containing gliomatous tissue.

A CASE OF CEREBRAL ABSCESS FOLLOWING OTORRHŒA.

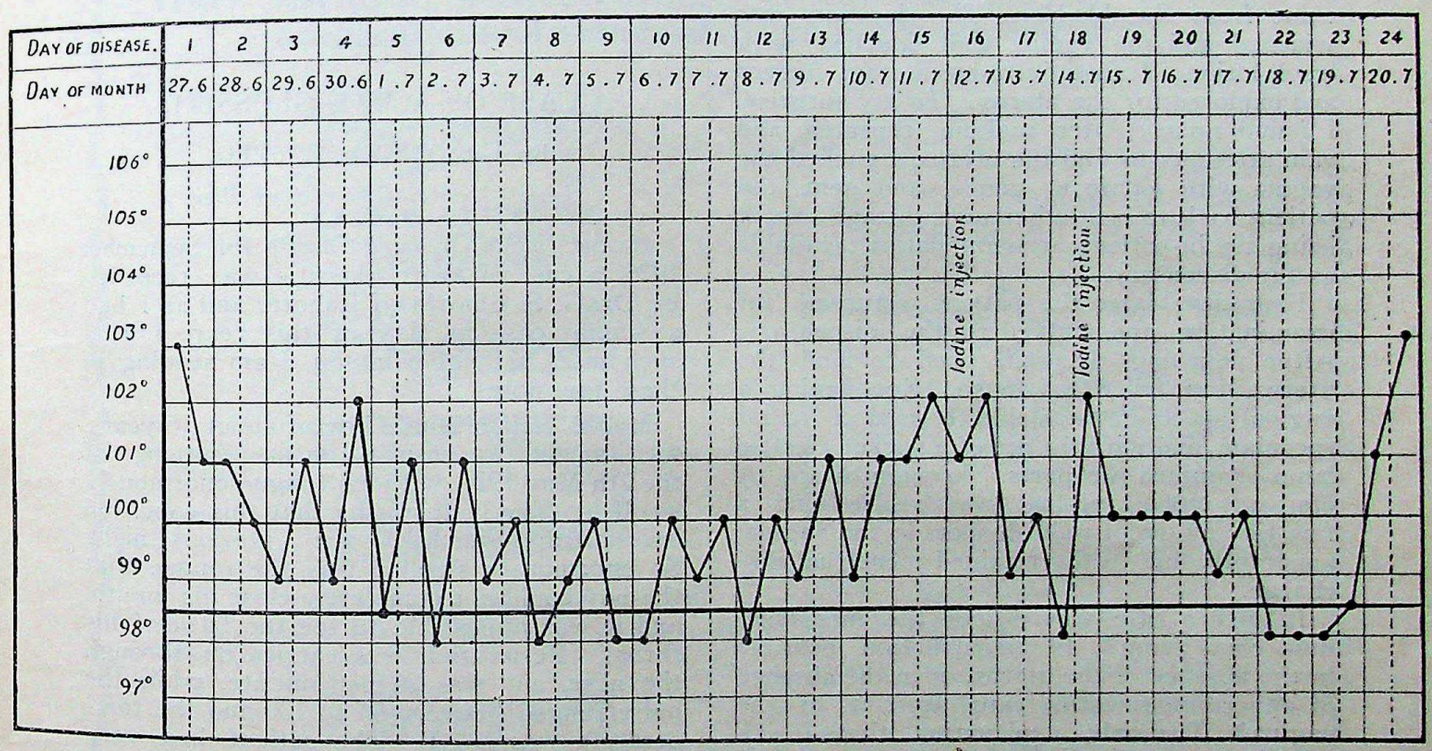
By MATI LAL DAS GUPTA,

Sub-Assistant Surgeon, Jail Hospital, Barisal.

RAMJAN ALI, an old man of 55 years, was admitted to this hospital on the 27th June 1926, suffering from otorrhœa on the right side, with fever, and a temperature of 103°F. tion continued the whole day; the temperature went up to 103°F., and the patient died at 5 p.m.

Autopsy.—On post-mortem examination the right side of the brain below the Rolandic area was found to be congested and a big cerebral abscess was found below the surface in this area.

A special feature of this case was that the patient had never shewn symptoms of cerebral irritation until the 20th June when symptoms suddenly set in. Had he complained of severe headache, or had he shewn any suspicious symptom, one would have trephined. The injections of iodine intravenously appeared to be curing the condition, but the onset of suppuration in the brain appeared without any previous warning.



The discharge from the ear was very offensive, and his bowels were constipated, though they moved after an enema. In two or three days' time he was better and the discharge was much reduced, but he again got high fever on the 1st July, and this time the fever was of a hectic character. On the 12th July he was given an intravenous injection of tincture of iodine (1 c.c. in 10 c.c. of distilled water), and the fever came down the next day, but then again rose to 102°F. He was given a further injection of the same dose on the 14th. By the 18th the temperature had dropped to normal and he seemed to be progressing satisfactorily. On the 20th, however, he vomited several times and suddenly became unconscious. The temperature shot up to 101°F., his left extremities became paralysed, and also the right side of his face. This condi-

I am much indebted to Rai J. N. Mittra Bahadur, Civil Surgeon, Bakargunj, for his kind permission to publish the notes on this case.

A CASE OF GENITAL ATRESIA.

By K. KOCHUNNI MENON, L.M.P.,

Sub-Assistant Surgeon, Anthikaeb Dispensary, Cochin.

A *pulaya* girl, Kotha by name, aged 18 years, was brought to me at this dispensary on the 29th July, 1926 by her parents with a history of difficulty in micturition and backache. She looked sick and distressed and could only walk with difficulty. Enquiry elicited the statement that she had never menstruated. My female compounder, who

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carried out an examination of the patient, reported that the vulva was occupied by a projecting fleshy mass.

I examined the patient and found that the case was one of genital atresia. A cyst-like mass was found bulging externally from the vulva, its septum thick and tensely drawn to the lateral edges of the vulvo-vaginal entrance. A small spot a little above the centre of the septum appeared to be quite thin, shining, and smooth. The transverse diameter of the septum was some 1¾ inches.

Operation.—An enema was given and the parts cleaned. An exploratory puncture was made with a needle in the centre of the thinned-out membranous patch and settled the diagnosis, for immediately about a pint and a half of dark venous blood and glairy fluid gushed out, together with a profuse flow of urine from the bladder. The incision was widened and the vagina well douched with lysol lotion. I then introduced my fingers and explored for the uterus. To my surprise, I found none. After making repeated and vain attempts to find the uterus, I packed the vagina with iodoform gauze, and sent the patient back to bed in her own cottage—there being no in-patient accommodation available at the dispensary.

Four days later the patient returned for examination, and walked to the dispensary. After douching, I again tried to find the uterus, but failed to do so. Not having a vaginal speculum available, I used a rectal speculum, and with the aid of a pocket electric lamp examined the parts. No sign of any os uteri was visible; all that was visible being a few tiny pin-point reddish spots in the vagina, apparently due to the retained menstrual discharge.

In such a case, where does the menstrual fluid come from? Is menstruation possible in the absence of the uterus, or in the absence of any communicating canal from it to the vagina? The only explanation that I can offer is that, owing to the great distension of the vagina from the retained menstrual fluids and the distended bladder, the cervix may have been completely taken up by the vaginal walls, and the uterus pushed down into Douglas' pouch, so that a tiny posteriorly-situated os uteri was invisible. I asked the patient to return for further examinations later, when conditions should have become more normal, but she unfortunately did not do so.

The interest of the case lies—not so much in the imperforate hymen, which is a condition frequently encountered in medical practice in the tropics—but in the complete failure to find any sign of a uterus. Readers of your journal may possibly be able to supply some information on this point.

(*Note.*—Cases of imperforate hymen are of such frequent occurrence in India that scarcely a month passes without our receiving one or more reports of the occurrence of this condition. The interest of Dr. Menon's case, however, lies in the *age* of the patient. Atresia of the genital canal in these cases may occur at the hymen,—the usual situation,—at the os uteri, or between the cervix uteri and the cavity of the body of the uterus—the latter two situations being unusual. Should the obstruction persist for some years after puberty, actual atrophy of the uterus may occur, the thinned-out and atrophied uterus lying as an imperceptible organ upon the top of the ballooned vagina or cervix. The condition present in Dr. Menon's case appears to illustrate this point. It would be very interesting if the subsequent history of this patient in after-years could be traced. —ASSIST. ED., *I. M. G.*)

A CASE OF ACUTE GLOSSITIS.

By A. BAYLEY DE CASTRO,

Junior Medical Officer, Port Blair.

IN the *Indian Medical Gazette* for September 1926, a case of acute glossitis was recorded by Dr. G. S. Chawla of Lahore, and as I had a similar case in May of this year, and as such cases are not common, I am sending in these few notes.

Magha Lall, a Hindu boy of about 16 years, was brought to hospital on the morning of the 7th May 1926, with his tongue enormously swollen. The history was that this condition had started insidiously the previous night. So enormously swollen was the tongue that the boy could not completely close his mouth, and it was impossible to see the back of his throat. Respiration was carried on through the nose, and was 26 per minute, while the pulse ranged between 96 to 100 and the temperature was 100°F. The patient had very dirty teeth. An acute streptococcal infection was feared. There was a good deal of salivation. In spite all this, however, the patient did not appear to be greatly distressed.

He was given a brisk purge, a hot antiseptic gargle frequently, and externally a spongiopiline fomentation was applied.

There was a lot of relief by the morning of the 8th, and by the morning of the 9th the swelling of the tongue was so much reduced that a proper examination of the inside of the mouth was possible. It was then discovered that about the middle of the right side of the tongue there was a small ulcer, caused most probably by the friction from a jagged carious tooth.

There is nothing further to record, but one salient feature should be remembered, i.e., the sudden onset in these cases.

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Indian Medical Gazette.

JANUARY.

THE FUTURE OF MALARIA CONTROL IN INDIA.

THE year 1927 is likely to prove of considerable importance in connection with the study and prevention of malaria in India.

. . . . . .

In January 1927, India will have the honour of welcoming Sir Ronald Ross, and a tablet is to be unveiled at the small laboratory in the grounds of the Presidency General Hospital, Calcutta, where he made his ever-memorable discovery. The story of Ross' great discovery has often been told, but—as it is perhaps unfamiliar to the present generation of medical men in India—we may perhaps be excused for again giving an outline of his work.

In the year 1895, Sir Ronald Ross—at that time Surgeon-Major Ross of the Indian Medical Service—determined to discover how malaria was transmitted from man to man. The conditions under which Ross worked are to-day almost incredible to the medical research worker in India. The story is fully told in his *Memoirs*, a volume which every worker imbued with the spirit of discovery should read. It is true that there had been great pioneers of medical research in India prior to Ross' day—D. D. Cunningham, Vandyke Carter and Timothy Lewis, to name but three; but in 1895 a military medical officer who was keen on research work was regarded as a somewhat unpleasant phenomenon—polo and pig-sticking being far more important. To-day, thanks to the re-organisation of the Indian Medical Research Department by the late Sir Pardey Lukis, conditions are utterly different; the problems are there, there is financial provision for their investigation, the only difficulty is to find men of the right type to investigate them; conditions such as were present in Ross' day can never recur.

Ross had been on furlough to England in 1894, where he came under the spell of the late Sir Patrick Manson, at that time Dr. Manson, who had retired from practice in China, and who was living in Queen Anne Street, Cavendish Square. Manson shewed him the malarial parasite, which had been discovered by Laveran in 1880, and drew his attention to the 'crescents' (gametocytes) of *Plasmodium falciparum*. Fedschenko (1869), at the suggestion of the great German parasitologist Leuckart had established the fact that the guinea-worm *Filaria medinensis* passes a phase of its life-cycle in the water crustacean *Cyclops*. Manson in 1877 had discovered that another filaria of man, *F. bancrofti*, has a similar cycle of development in the mosquito. King in 1883 had written a most remarkable paper in which he gave nineteen reasons why mosquitoes are likely to carry malaria; whilst the ancient Romans had used mosquito-nets as a preventive measure against malaria—a practice which they appear to have borrowed from the Greeks, and which they in turn, as Herodotus remarks, appear to have borrowed from the ancient Egyptians. The ancient writings, including those of Susruta in India, contain many vague suggestions of the association of malaria with mosquitoes. To make a suggestion, however, is not equivalent to making a discovery. Manson suggested to Ross that malaria is conveyed by mosquitoes; he thought that the mosquito ingested the malarial parasites with the patient's blood; that it then fell into water when it died; that the infected dead mosquito or its remains were swallowed by man in his drinking water, and that man thus acquired infection with malaria. The true facts were discovered by Ross, but from first to last Manson acted as sponsor and gave him every encouragement. Ross returned from furlough to Secunderabad in 1895, determined to tackle the problem.

At that date there was practically no literature on mosquitoes, and Ross—not unnaturally—turned first to the 'grey' and 'brindled' mosquitoes, i.e., those of the genera *Culex* and *Aëdes* (*Stegomyia*). The stage of flagellation of the microgametocyte he immediately discovered, indeed it had been seen previously by Laveran in freshly drawn blood, and can be studied in fresh blood *in vitro* apart from the mosquito. In August 1895 he discovered the zygote or travelling vermicule of the malarial parasite, and in September of the same year he was suddenly transferred to Bangalore on special sanitary duty. To some extent, perhaps, Ross had himself to thank for the troubles that followed; he was a man who could tolerate neither fools nor authority patiently, whilst he sought—not to unravel—but to cut through red tape—an impossible procedure. Thus his views on his sudden transfer to Bangalore are given in the following stanza from his notebook at that date:—

> "We cry, 'God make us Kings,
> Poets or Prophets here'.
> The scornful Answer rings,
> 'First be My Scavenger'."

In 1897, however, Ross reverted to Secunderabad, and at Sigur Ghat suddenly came across a mosquito which was neither 'grey' nor 'brindled' but which had spotted wings, i.e., an *Anopheles*. The discovery gave him furiously to think. He turned to this

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genus and on the 20th August 1897 suddenly came across a malarial oöcyst in an infected anopheline mosquito, the first and most important event in his great discovery. His first publication of this discovery was despatched to the *British Medical Journal* in September 1897, after he had further confirmed the existence of the oöcyst stage in infected anophelines, and was published in that journal on the 18th December 1897. He had no sooner reached this very important stage in his discovery than he was transferred to Bombay on military duty, and thence to Kherwara in Rajputana.

In the same year (1897) MacCallum discovered the process of fertilization in *Hæmoproteus columbæ*, the parasite of pigeon malaria, and the true nature of the malarial oöcyst now became clear. At Kherwara, however, cases of malaria and *Anopheles* mosquitoes were rare and Ross' work was interrupted. After insistent and persistent requests to be placed on special duty to investigate the problem, Ross was finally put on special duty for six months with instructions to investigate the transmission of both malaria and kala-azar within that period—a not inconsiderable task, seeing that the latter problem alone has taken twenty-three years of work, and the solution is not even now complete. With a comment of 'Victory or Westminster Abbey' Ross departed for Calcutta in March 1898.

In Calcutta, cases of malaria were rare, and Ross turned to the closely allied *Plasmodium præcox* parasite—or Proteosoma, as it is frequently termed—of birds. The stages of fertilization and of oöcyst formation of this parasite were immediately discovered, and in May 1898 Ross' first official report, *Cultivation of Proteosoma, Labbé, in grey mosquitoes* was sent in to Simla. This report was not officially issued until October 1898, but in the meantime some thirty or forty copies of it were sent to Europe, America and elsewhere. In June of the same year Ross discovered the liberation of sporozoites into the cœlomic cavity of the mosquito and succeeded in infecting healthy birds from infected *Culex* mosquitoes. He cabled to Sir Patrick Manson and Manson published an abstract of of the work in the *British Medical Journal* of June 18th, 1898. In July of the same year Manson gave an account of the discovery at the British Medical Association annual meeting at Edinburgh, and this address was published in the *Journal of Tropical Medicine* for August 1898, also in the *Lancet* in the same month, and in the *British Medical Journal* in September 1898.

In July 1898 Ross discovered the invasion of the salivary glands by the sporozoites, and—as he had previously succeeded in infecting clean birds by the bite of infected mosquitoes—the whole of the transmission cycle for *P. præcox* was thus discovered. In October 1898 Ross' *Preliminary Report on the infection of birds with Proteosoma by the bites of mosquitoes* was published from the Government Press, Calcutta. It now only remained to apply these results to man, and to work out the similar life-cycle of the human malarial parasites in *Anopheles* mosquitoes. Ross, however, had to leave Calcutta for Assam in August 1898, to take up the kala-azar investigation, with his malaria work unfinished.

He returned to Calcutta in November 1898, determined to finish the work. Unfortunately he started work with *Anopheles rossi*—the commonest anopheline mosquito of Bengal, but not a true carrier of malaria in Nature.

It is to be noted that, up to this point, Ross had worked out the whole of the transmission cycle of *Plasmodium præcox* in *Culex* mosquitoes, had seen oöcysts of human malarial parasites in *Anopheles* mosquitoes, and had predicted that the transmission cycle of human malarial parasites would be found to occur in *Anopheles* mosquitoes, and that it would be identical with that of *P. præcox* in *C. fatigans*. Also that advance copies of his first report had reached Europe and had been extensively circulated, and that the knowledge of his proteosoma discovery was widespread.

The Italian workers now entered the field. The question of priority with regard to the discovery of the sporongony cycle of the Plasmodiidæ has been the subject of endless controversy since that date, but there can be little doubt that the Italian workers were familiar with Ross' proteosoma work. Thus Grassi in his first publication in October 1898 (*Policlinico*) refers directly to Ross' work; in his second paper in November 1898 (*Lincei*) he refers to Sir Patrick Manson's address to the British Medical Asociation in the previous July, and states that he had received some of Ross' proteosoma specimens and mosquitoes from Manson. Bignami succeeded first in experimentally infecting man with malaria from *Anopheles* mosquitoes on November 3rd, 1898, and in his first paper in November 1898 (*Bull. R. Accad. Med. d. Roma*) discussed Ross' work at length. The Italian workers deserve every possible credit for applying Ross' results with proteosoma to human malaria, but their work can hardly be regarded as having been 'independent' of Ross' great discovery.

The Italian workers were greatly helped by two further events, the introduction of the Romanowsky stains, and Ficalbi's work on Italian mosquitoes which enabled them to identify the species of mosquitoes encountered and experimented with. Bastianelli, Bignami and Grassi (1898) observed the

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oöcysts of *P. falciparum* in anopheline mosquitoes—just as Ross had done in 1897. They also succeeded in infecting man experimentally from mosquitoes. Later in the year Grassi, Bignami and Bastianelli (1898) observed the complete cycle of development of *P. falciparum* in *Anopheles maculipennis*, and the partial development of *P. vivax*. Early in 1899 Grassi, Bignami and Bastianelli reported the development of *P. malariæ* in the same mosquito, and Bastianelli and Bignami (1899) that of *P. vivax*. Other papers followed by Grassi, Bignami and Bastianelli (1899*a*), Bastianelli and Bignami (1899), Grassi (1900), Ziemann (1900), and others. Ross himself left India on furlough in February 1899, and in the same year worked out the sporogony cycle of *P. malariæ* in *Anopheles* mosquitoes in Sierra Leone. In the meantime Ross' work on proteosoma had been confirmed—if it wanted any confirmation—by Koch (1899) and by Daniels (1899). Finally the whole sporogony cycle of the malarial parasites of man was described in full detail in a classical monograph by Grassi (1900). The full history of Ross' work and of his great discovery may be read in his *Memoirs*; whilst Nuttall (1901) has published a full account of the history of the discovery of the malaria transmission cycle, dealing with the papers published in their chronological order.

Thus, in the small laboratory at the Presidency General Hospital, Calcutta, there was made the tremendous discovery which will ultimately profoundly affect the health, the happiness, and the material welfare of more than half the human race. For Ross' great discovery meant that man can combat and can overcome malaria, both in its endemic and in its epidemic phases. Not only that; it led to the discovery of the mode of transmission of sleeping sickness and of kala-azar, to a thousand and one developments in tropical medicine and veterinary science.

We British are a strange race. We cover the Maidan of Calcutta with statues of second-rate generals and third-rate legislators, yet we have at present no permanent memento of Ross' great discovery. In Great Britain a Ross Institute and Hospital for Tropical Diseases at Putney Heath has been erected by public subscription and was opened in 1926 by the Prince of Wales. This institute is still badly in need of funds, and it is hoped that India will play an important part in supplying the deficiency. In India—prior to 1927—the only recognition of Ross' work has been the award to him in 1903 of the Barclay Medal of the Asiatic Society of Bengal—the only honour which it is within the power of that Society to bestow in recognition of original research work in the sphere of tropical medicine and biological science. His knighthood, his Fellowship of the Royal Society, and the Nobel Prize have all been honours which have been awarded to him from outside India. It is time—and more than time—to do tardy justice.

Sir Ronald Ross is to deliver certain lectures in Calcutta in January 1927. From what we know of him, we may anticipate that he will give utterance to no platitudes. It is far more likely that he will have not a few home truths to deliver, and that his lectures will contain both criticism and suggestion. For several years in our most admirable contemporary *Science Progress* he has preached the gospel of 'discovery and reward'; his splendid address on the management of medical research was re-printed in our issue for May 1924, p. 251, and it is not unlikely that Sir Ronald's visit to Calcutta will arouse widespread discussion and interest.

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In the second place, Sir Ronald's visit is exceedingly timely. As our readers are aware, the Government of India and the Indian Research Fund Association have recently taken the malarial situation in India seriously in hand. The Central Malarial Bureau at Kasauli has been expanded as far as its limited site in that small hill station will allow. Plans are being considered for the creation of an all-India Central Malarial Institute at Delhi or some other suitable site, with field laboratories, instructional classes, and the planning of malarial surveys. Three new malarial research posts under the Indian Research Fund Association have just been created, and these men will all be at work within the next few months. It has often been said that India has taken less advantage of the great discovery which Ross made in Calcutta than any other country in the world. Such a reproach, however, is not justified; it is lack of means and not of opportunity that has held back anti-malarial work in India during the last quarter of a century. Wherever the results of Ross' great discovery have been applied, immeasurable benefit has resulted to the populations concerned. The Americans—by a lavish expenditure of money—have been enabled to construct the Panama Canal, where the French had previously failed owing to the prevalence of mosquito-borne malaria and yellow fever; Sir Ronald Ross himself has been responsible for converting Ismailia on the Suez Canal from a malarial hotbed into the sanitorium of Egypt, for cleaning up Cyprus, and for much work in Mauritius. The work of Sir Malcolm Watson in Malaya has often been referred to in our columns, whilst the fine work of Lt.-Col. Phillips in connection with the labour force on the Sarda Canal scheme has also been referred to. Wherever funds and men have been available, malaria has been controlled, and—in some localities—almost exterminated.

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From the days of the great discovery by Ross till now research work on malaria has followed on lines which were to be expected as a result of that discovery. Inasmuch as *Anopheles* mosquitoes were shewn by Ross to be among the greatest enemies of mankind, extensive work has taken place with regard to the identification of species—both in the adult and larval state, with regard to their breeding and seasonal habits, their distribution, and to determine what species carry malaria and under what circumstances. On the human side methods of diagnosis of malaria have been vastly improved, and the use of thick film and cultural methods in diagnosis introduced; the ætiology of relapses in malaria has received much attention; the pathology of the disease and—above all—the best methods of treating the patient have been the subject of countless papers and investigations. In brief one may say that to-day we know the main outlines with regard to world malaria; we have defined the objective of attack, to use a military phrase we have an 'appreciation' of the situation.

Simultaneously with the visit of Sir Ronald Ross to India, and with the vigorous anti-malarial policy of the Government of India, we are faced to-day with the fact that some of the great Indian commercial interests have become awake to the gravity of malaria with regard to their undertakings. The Indian Railway Board has taken up malaria as a railway disease and a railway problem of the greatest importance; in several railways whole time malariologists have been appointed, and already splendid results are being achieved. Thus in the construction of the new Bengal-Nagpur line for the new big harbour at Vizagapatam special difficulties were encountered, since the new construction runs through an intensely malarious and black-water fever belt. Mr. Senior-White, whose previous work in Ceylon under the Royal Society, and also in Malaya is well known, was appointed as a whole time malariologist. The result has been that in some of the camps the incidence of malaria has been reduced by 90 per cent. within a year; the whole situation is in hand and is being grappled with.

The Indian Tea Association takes malaria on the tea gardens of the Dooars and Assam very seriously. Under a special financial grant from this Association Dr. C. Strickland, Professor of Medical Entomology at the Calcutta School of Tropical Medicine, has carried out an extensive survey of malaria in the tea gardens of Assam, and his voluminous report is now ready for publication. Several of the big commercial firms concerned have employed experts of international reputation for short periods to study the local malaria problems on their gardens and to make recommendations. The Indian Mining Association is gravely concerned with the severe endemic malaria in Singhbhum and other adjacent districts, and the excellent reports by Colonel Christophers (1923, 1925), and Major Watts (1924) have thrown a whole flood of light upon the situation in these districts. In Bombay the work of Capt. Chalam (1924) in controlling malaria in the work on the Back Bay Reclamation scheme has been one of the few bright spots about that ill-fated venture. The cotton industry of Bombay is not neglecting malaria as one of its big problems—a problem rendered especially acute by the number of old disused tanks in the areas concerned, relics of the days before the introduction of electric power for the mills.

In the Military Department in India matters have profoundly changed within the past fifteen years. There is no longer the old-fashioned policy of employing a havildar and a squad of sepoys to indiscriminately oil any and every collection of standing or running water within cantonments in the vague hope of eliminating all mosquitoes—whether of genus *Anopheles*, *Culex* or *Aëdes*; military medical officers are expected to 'know their mosquitoes,' or at least to be able to put forward proposals for the control of malaria within a cantonment based upon a full and intelligent survey of the situation with reference to local conditions and seasonal prevalence. Throughout India district and municipal committees are paying increasing attention to malaria and to the need for its intelligent control. Finally, the evidence already given before the Royal Commission on Agriculture in India by the Public Health Commissioner with the Government of India shews that that Commission will be forced to recognise that if the welfare of his beasts and crops is of importance to the Indian *ryot*, his health and his ability to work his fields are of not less importance, and that malaria is the biggest problem in the public health of India.

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To summarise, we may say that never in the history of India has there been a moment when public interest has been more sharply focussed on malaria as the gravest problem in Indian public health. There is to-day no stinting of funds for the necessary measures of control; medical men and laymen alike recognise the supreme importance of the position. What is lacking are properly qualified and trained men for malaria survey work.

It is not the function of this journal to make suggestions in connection with so interesting and intriguing a situation; yet there are certain aspects of the present position that seem to us to require to be emphasized. Above and beyond all, it would seem that there is grave necessity for some co-ordinated

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policy, in order that energies may not be frittered away and money wasted.

(1) In the first place there is apparent the need for continuous research work on malaria. It might seem, on a superficial study of the situation, that we already know so much about malaria that what is wanted is an application of our already garnered knowledge in the sphere of practical public health rather than an extension of that knowledge. Yet to come to such a conclusion is to entirely misread the situation. We may seem to know a great deal about malaria, but in reality we have as yet but grasped the bare outlines of the situation. With regard to man as a host of the malarial parasite, there are to-day dozens of unsolved problems. How do the malarial parasites produce the symptoms of malaria? It sounds an elementary enquiry, but it has never been answered. Abrami and Senevet (1919) consider that the rigor in malaria is a reaction of an anaphylactic nature, that either the merozoites liberated on rupture of the infected red corpuscles of the blood, or possibly the products of the destroyed red corpuscles themselves act as would an intravenous injection of foreign protein into the blood stream. The rigor in malaria is compared by these writers to that which follows on an intravenous injection of "T.A.B." vaccine in the non-specific treatment of arthritis. Further, what is the situation of the malarial parasite; is it inside or only upon the surface of the red corpuscles? How does man overcome malarial infection; is it due to the formation of immune bodies in his blood plasma, or to a sort of acquired tolerance? With regard to treatment, what is the best drug to use, what is the best way of administering it, and how does it act? Is prophylactic quinine of any use, or none? These are but a few of the big unsolved problems in malaria as it affects the human host.

Elsewhere in this issue will be found a most interesting and thoughtful essay by Mr. R. Senior-White, Malariologist, Bengal-Nagpur Railway, and Mr. Kenneth Williamson, formerly Malaria Research Worker, Federated Malay States, on the future of anti-malarial research. From the entomological aspect of malaria these authors shew that we are still profoundly ignorant. We know the various species of *Anopheles* mosquitoes and their selective breeding sites, which of them prefer sluggish water, and which of them running streams for instance. But there are a hundred and one facts which may profoundly affect the breeding of mosquito larvæ of different species. A slight change in the hydrogen ion concentration of the water or in its mineral content may transform a breeding ground into one quite unsuitable for the larvæ.

The food of the larvæ requires study, for a change in the algal flora of a breeding place may make all the difference between repletion and starvation of the larvæ. We know very little about the natural enemies of mosquitoes, and even less about their natural diseases. *Anopheles* larvæ are frequently parasitised by nematode larvæ and by protozoal parasites of the order Microsporidiida. Such microsporidial infections are apt to prove very fatal to the larvæ; just as in pébrine infection in the silkworm, so in microsporidial infection of *Anopheles* larvæ, the entire tissues of the larva become destroyed and very little is left except the lumen of the intestinal tract and the cuticle. Such infections spread very rapidly in a pond; in a pond where the infection is present the larvæ may all die off rapidly, whilst in another pond a few yards away not a single larva may be infected. Might it not be possible to utilise these natural enemies and infections of mosquitoes for their extermination at a cheap cost? There are a hundred and one aspects of the problems of malaria calling aloud for investigation.

The men to carry out such work are few and far between. Protozoologists, entomologists, and biochemists are not born, but made—usually made by many years of personal study, reading, and investigation. It is not every worker who has the faculties and the adaptability needed for research work. Yet if we are to get a move on with the problem, such men must be appointed; and often teamwork by men in different branches of malariology will be called for.

To take such men and place them on ordinary malarial survey work is a waste of men and a waste of money. It is like using a sledge hammer to crack a walnut. Industrial concerns cannot afford their salaries for prolonged periods of investigation, whilst less highly skilled but fully trained officers of lower grade can do the work, if properly supervised.

(2) It is facts such as these that face the commercial industries of India and still more so the Provincial and Imperial Governments, and District Boards and municipalities when they try to grapple with malaria, and which hold up progress. Paris green is one of the cheaper larvicides recently introduced. The Public Health Service in the vicinity of Lake City, Florida, carried out an experimental investigation on the cost of hand dusting with Paris green, and found that the approximate cost was $5.90 per application per acre. Where large collections of standing water have to be dealt with, King and Bradley (1926) have shewn that dusting by aeroplane is probably considerably cheaper, and the photograph below of this process is reproduced from their article in the *Journal of Tropical Medicine and Hygiene* (Vol. XXIX, No. 18, p. 312), and illustrates one of the newest methods of mosquito control.

(3) And this point brings us to the third important fact in the problem of the control

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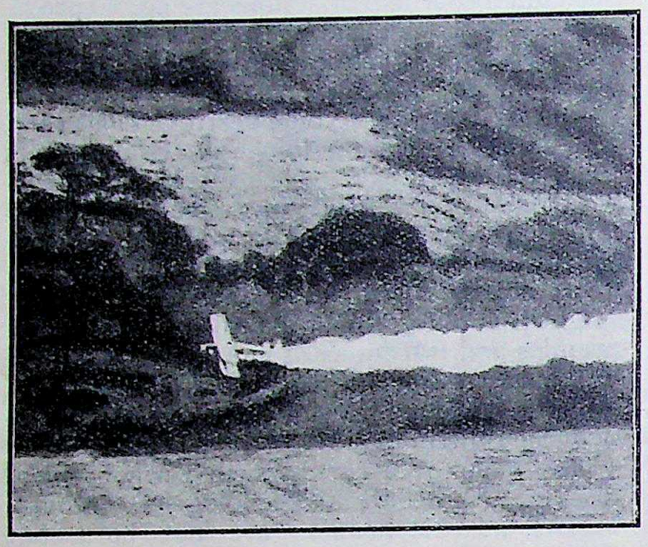
of malaria in India. Present-day measures are too costly. A few figures from Sir Ronald Ross' book on the *Prevention of Malaria* will illustrate this. The Americans reduced the annual death rate from malaria among the workers on the construction of the Panama Canal from 11.59 per thousand in



Dusting the marginal zone of Field Lake with the wind blowing towards the lake; the plane was flown outside of the tree line and the dust drifted into the breeding area.

From:—The *Journal of Tropical Medicine and Hygiene.*

1906 to 1.23 per thousand in 1909. Yet the annual expenditure incurred on sanitary measures was approximately $3.50 *per capita*, of which approximately $2 *per capita* was expended on anti-mosquito work. If a similar proportion was to hold good for India—a land with more than 350 million inhabitants—a sum of two to three thousand crores would be required to produce a similar result. In Italy in pre-war days the cost of subsoil drainage to check malaria worked out at about 8 guineas per acre of land, and quinine prophylaxis and screening were largely resorted to as cheaper measures. At Ismailia approximately 2,000 cases of malaria occurred annually before anti-mosquito measures were adopted; there were 2,284 admissions to hospital for malaria in 1900 and the Canal Company contemplated the abandoning of the station, which de Lesseps had intended to be the commercial capital of Egypt. Sir Ronald Ross started work in 1902, and by 1906 malaria had been abolished from the station, no fresh cases occurring in 1906 and 1907. The capital cost of the operations was approximately £2,000 and the annual recurring cost about £1,000. In Cairo Sir Ronald Ross estimates that it would involve an expenditure of about £20,000 annually to clear the city of mosquitoes.

(4) As matters at present stand, when an industrial concern wishes to grapple with malaria amongst its labour force, what may appear to be an expensive policy at first sight often turns out to be the cheapest in the end. The first essential is to secure the services of a properly trained investigator to carry out a detailed investigation lasting over a period of twelve months. Only when a full and detailed knowledge of the local and seasonal conditions present has been acquired can the campaign against malaria on the estate be properly drawn up and carried out. Indiscriminate anti-mosquito measures applied by some local medical officer with no special training in anti-malarial work are almost useless, and any expenditure incurred in having the situation fully studied before measures are taken is fully justified.

It ought to be possible to get such a type of man in India on a salary of from Rs. 350 p.m. upwards, but the supply of such men is at present entirely inadequate to the demand for them. In a recent *viva voce* examination for an Indian university D. P. H. the writer asked the candidates which were the important species of *Anopheles* mosquito which carry malaria in India, and what were their special breeding places. Not one of them had any idea; they could distinguish an *Anopheles* from a *Culex*, and that was all. Yet such post-graduate students are the men who will be called upon to serve as District Health Officers and to tackle malaria within their districts. We have got to make a real effort in India to train Indians of the right class for anti-malarial work; and they must be men of the right stamp, who will not be afraid to explore jungle and swamp, to use their energy and brains.

Even the text-books for teaching such students are almost lacking at present. Stephens and Christopher's invaluable manual on *The Practical Study of Malaria* is out of print. The small book on *Mosquito Reduction and Malarial Prevention* by Captain Crawford and Dr. Chalam, just published by the Oxford University Press at Rs. 3, and reviewed on p. 51 of this issue of this journal is a good start in the direction of providing a text-book, but is of rather an elementary character. It is eminently suitable for assistant and sub-assistant surgeons, and should prove most useful to junior workers in India. A larger and more detailed text-book on the subject is at present in course of preparation at the Calcutta School of Tropical Medicine, and it is hoped that it will be published within the next few months.

Whatever the organisation adopted for the training of medical men in India in malaria investigation and control, there can be no doubt as to the need for such trained workers in the field in India.

In carrying out well planned measures it is not essential to employ *medical* men, so much as properly trained men. At Khartoum

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much of the supervision of sanitary and anti-mosquito work has been carried out most successfully by trained non-commissioned military officers. Indian labour—especially Indian coolie labour—is apt to be inefficient unless it is properly supervised, and personality counts for much in the selection of the right type of supervisor.

. . . . . .

In whatever way the situation in India develops during 1927 and subsequent years, it is clear that we are on the verge of important advances. A demand for research workers of the highest ability is bound to arise, also a still more urgent demand for trained investigators in anti-malarial work. Central organisations, provincial organisations, and industrial organisations—each for the industry concerned—are likely to arise. The future is full of promise, but it is important that schemes and plans shall be co-ordinated and be well planned. In a word the situation calls for a well defined policy.

R. K.

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BRIEF NOTES ON THE LIFE AND WORK OF SIR RONALD ROSS.

(Made for the most part from the *Memoirs* by *Ronald Ross*. London: John Murray.)

SIR RONALD was born at Almora in the Kumaon Hills in 1857 (3 days after the outbreak of the Indian Mutiny).

The date of his birth (13th May) is said to be the most unlucky of all birth-days. Sir Ronald's comment is "Those who enter the world on that day may console themselves by attributing all their failures to misfortune and therefore all their successes to merit."

His first memories are of mountains, snows, rhododendrons and fir-trees, his next of a father sick with fever lying in a palanquin in a burning plain.

Ross lived in India till the age of eight, when he was sent to England. At school his chief interests were mathematics, drawing and music. As a student at St. Bartholemew's Hospital he describes himself as taking little interest in his medical studies, music and poetry being more to his liking.

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He entered the Indian Medical Service and came to Madras in 1881. Even now his medical work did not attract him and most of his time was spent in studying in the original languages the works of Tasso, Alfieri, Racine, Hugo, Schiller, Gœthe, Homer, Aeschylus and Virgil. The composition of poetry still engaged much of his attention and while in Madras he wrote a poem ending with lines which sound almost prophetic of the part that he was destined to play in the improvement of human environment.

"O Heaven, shall man rebelling never take
From Fate what she denies, his bliss?
Cannot the mind that made the engine make
A nobler life than this?"

In 1882 what he called his "great calamity" occurred; this was the reading of a book called "The Orbs of Heaven" which so fired him with zeal for the study of mathematics that the next five years were spent on various branches of that science, his relaxation taking the form of writing poetry.

During these five years he saw service in many parts of India and also in the Andaman Islands.

In 1888, thoroughly worn out by intensive study and the climate, he returned to England, where he suddenly discovered a zeal for medical work and took the D.P.H. of the Royal Colleges of Physicians and Surgeons. He also took out a course of study in the new science bacteriology, under Professor Klein. At the end of his leave in 1889, a novel which he had written in India was published; this met with a very mixed reception, but evidently it had great merit as it called forth a spontaneous letter of praise from Rider Haggard.

During the next four years Ross became much interested in the fevers of India on which he wrote a poem containing these lines—

In this, O Nature, yield I pray to me.
I pace and pace and think and think and take
The fevered hands and note down all I see,
That some dim distant light may haply break.
The painful faces ask, can we not cure?
We answer No not yet; we seek the laws.
O God, reveal thro' all this thing obscure
The unseen small, but million murdering cause.

These lines may well be regarded as a prayer which was to be answered in after years.

The next spell of leave was in 1894 and till then his interest in literature was a serious rival of his medical work. A book called "Spirit of Storm" was published by Methuen and Co. and received very favourable reviews, especially one by Mr. Stephen Gwynne, who described it as a "very notable book." Now his attention was turned very seriously to the study of disease and he was awarded the Parkes' Memorial Medal for the best essay on malaria.

He returned to India early in 1895 and the next four years of his life were devoted almost entirely to investigations in malaria.

The first great discovery in malaria had been made in 1880 by a French Military Surgeon, Laveran, who discovered the parasite which causes the disease. At that time the knowledge of the infinitely little had made such feeble progress even among medical men that small importance was at first attached to it, and it was not till some years later that the discovery was generally accepted.

Some savants had already suggested that mosquitoes had something to do with the spread of malaria, but when Ross started his work no one had the slightest suspicion of the means by which the disease was carried. It was not till 1894 that Ross first saw a convincing specimen of a malaria parasite, Sir Patrick Manson being his instructor. Manson had a strong conviction that mosquitoes carry malaria, his hypothesis being that the parasites develop in the body of the mosquito; when the mosquito is drowned in water the parasites infect the water, and the disease is conveyed to the patient by the water in which the infected mosquitoes have been drowned.

Ross started to work in Secunderabad in 1895. His enthusiasm for microscopical work was great and his first effort was to allow mosquitoes to suck the blood of persons suffering from malaria and to test the truth of Manson's view by causing human beings to drink the water in which the fed mosquitoes had been immersed. The result was, of course, negative.

A period of intense work was interrupted by a transfer to other duties and it was not till June 1897 that Ross returned to Secunderabad and took up his malaria investigations again.

On the 20th August 1897, Ross found that malarial parasites in blood which had been sucked by dapple winged mosquitoes underwent the degree of development which had previously been noticed in blood on a glass slide, and also grew in the stomach wall of the mosquito into a large rounded form. Ross was greatly excited as he thought he was on the point of completing the essential stage in the further development of the parasite, but at this point he was ordered to Kherwara in Rajputana where there was no malaria.

By the efforts of Manson, Ross was placed on special duty for six months from February 1898. On arriving in Calcutta he found that he was expected to solve not only the malarial but also the kala-azar problem in the half-year which was allotted to him.

One of his first disappointments was to find that there was no reference medical library in Calcutta, the next was that there was little malaria. Failing to find human material he tried experiments with birds, sparrows, larks and crows which often harbour parasites which closely resemble malarial parasites. Soon he found that *Culex* mosquitoes which had fed on infected sparrows showed the same kind of bodies which he had found in infected mosquitoes

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in Secunderabad. His first report to the Director-General was made on the 21st May 1898. By July, his work had reached the stage in which he discovered that the parasites found their way into the salivary glands of the mosquitoes. He also found that when infected mosquitoes were allowed to feed on healthy sparrows, these sparrows in a fortnight showed swarms of the parasites in their blood, while control healthy sparrows remained free from parasites. Every competent scientist at once realised the immense importance of the discovery. It only remained for other workers to go over the same ground using human beings instead of sparrows and the dapple winged or *Anopheles* mosquito which had already been the subject of Ross' own experiments in Secunderabad. Ross himself was absolutely certain that he had completely solved the problem. He indicated clearly what remained to be done to complete the experimental demonstration of the means of conveyance of human malaria.

In due course within a very short space of time other workers, who followed exactly the indications laid down by Ross, found that just as he had predicted the same series of events followed when suitable mosquitoes were allowed to feed on human beings suffering from malaria. These mosquitoes when allowed to survive for a few days were shown to be capable of conveying the disease to other human beings. The pity is that some foreign workers claimed to have done this work independently of the discoveries of Ross, but they are convicted by their own writings of having had the fullest knowledge of the work done by Ross, and now the scientific world is absolutely unanimous in giving the sole credit for the discovery to Ross, though even now there are many who are not aware of the completeness of his work. One misconception persists very strongly and for this Ross himself is partly to blame. This consists in attributing to Sir Patrick Manson the origination of the hypothesis of the mosquito transmission. It is true that Manson was strongly of opinion that the mosquito is concerned in the transmission of malaria, but as stated above he thought that the parasite developed in the mosquito which afterwards infected water, so that according to this hypothesis the disease would have been conveyed by drinking infected water. As we have seen, Ross at first followed up this scent but it only led him astray. When the discovery was completed, Ross generously reported that Manson's great hypothesis had been vindicated, and the world cannot be blamed if undue credit was given to Manson. In a sense the discovery of Ross was due to Manson, for it was the encouragement and advice of Manson which were largely responsible for the labours of Ross.

Ross complains with good reason that so little recognition of his work came from India. Indeed, almost the only public recognition of his discoveries came from Calcutta; the Asiatic Society of Bengal awarded him the Barclay Memorial Medal in 1903. It would, perhaps, be best to pass lightly over this failure of India to do justice to the greatest of her workers, but a reference to it may suggest the best means of doing penance for past neglect, this will undoubtedly be to promote with zeal further research in malaria and the anti-malarial work which has been made possible by the "great discovery."

In spite of the full recognition which was accorded to the work of Ross by scientists, some of his most ardent admirers did not realise its supreme importance. They admitted that Ross had shown that malaria could be transmitted from man to man by the mosquito, but they thought that his method was only one of several and perhaps the least important. Ross alone had the clearer vision which enabled him to see that any other mode of transmission was exceedingly unlikely and from the first he preached in season and out of season the gospel of malaria prevention by mosquito control. "As every schoolboy knows," Ross was right, mosquito control is the same thing as malaria control. No mosquitoes, no malaria!

In another respect his visions of the future were wrong, he thought that in two years malaria would be stamped out of every city and large town in the tropics, at least in those that have sanitary departments such as exist in British possessions. On his voyage home to England in March 1899 his mind was much occupied by dreams of the great cleansing which the tropics would undergo, he imagined the heads of the India Office, the Colonial Office, the War Office and the Foreign Office setting the whole machinery in motion within a few weeks. Such thoughts cheered the wearied victor after his exhausting battle. Bitter disillusionment was to follow. Instead of the honours and rewards which he anticipated for Manson and himself he found that a post with a salary of about Rs. 300 a month guaranteed for three years was all that was offered to him. This post he accepted as it seemed to offer a prospect of carrying out his policy of expeditions to the tropics and experiments in sanitation. Towards the end of 1899 he went to Sierra Leone where he was successful in completing his work by proving that the *Anopheles* mosquito was able to convey malaria from one human being to another, he also laid down very complete plans for the control of the disease and so comprehensive were these that it was by following them that all the great successful experiments in freeing the Panama Canal zone and other areas were afterwards carried out. It is nothing short of miraculous that one man has been able, almost unaided, to discover not only the means by which malaria is carried but also the means by which the disease can be controlled.

Another point of importance is that the discovery was by no means the result of chance, it was a case of forming a hypothesis which appeared to account for the known facts, then testing

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that hypothesis, and when it was found to lead in the wrong direction seeking out another trail until at last the truth was made known.

Those who knew most about the subject were the people who were most quickly convinced of the value of the great discovery, but it is safe to say that Ross himself was the only one who appreciated rightly the enormous significance of his own work.

In 1902 Sir Ronald had the opportunity of making the first great demonstration of the vast possibilities of his discovery by freeing Ismailia of malaria at a time when the evacuation of the town was being seriously contemplated. Soon after his return from Ismailia in December 1902 he was awarded the Nobel Prize of nearly £8,000, being the second recipient of the prize for medicine. This was the only substantial reward which he received for a discovery which has been worth many millions of pounds to the human race apart altogether from the saving of life and the prevention of sickness.

The after work of Ross has consisted in teaching the world how to prevent malaria. To some extent this was a thankless task, his discovery was made too soon, the intelligent sections of the world were not sufficiently well educated to realise the importance of his work, so that his teaching met with apathy and indifference except from a few enlightened men who converted his precepts into practice, to the great benefit of themselves and of the human beings whose lives they saved.

The Panama Canal could never have been constructed but for the work of Ross, even this great object lesson has not dispelled the inertia of the world and there are still vast areas which are lying desolate which might be converted into fruitful fields if only the advice of Ross were carried out. Some of the more important honours and awards which were made to Ross are:—

Fellowship of the Royal Society ..	1901
C. B.	1902
Nobel Prize	1902
Royal Gold Medal, Royal Society ..	1909
K. C. B.	1911
K. C. M. G.	1918

It will be noticed that the adequate State recognition of his work came years after his greatest work was done, and it was only the other day that the Ross Institute was opened by H. R. H. The Prince of Wales. The object of this institute is to honour Sir Ronald and to continue the work on malaria which lies so near to his heart.

It is to be hoped that Sir Ronald will be spared to see the adequate recognition of his discovery in the form of energetic practical application of the principles which he laid down so many years ago.

J. W. D. M.

SPECIAL ARTICLES.

THE DISPENSARY TREATMENT OF MALARIA IN INDIA.

By A. H. PROCTOR,
LIEUT.-COLONEL, I.M.S.,
Superintendent, Presidency General Hospital, Calcutta.

OF late years there has been a constant agitation in India for the establishment of Ayurvedic dispensaries. Also Government has been asked to establish training schools for Ayurvedic practitioners. Educated in an English school of medicine, I believe modern medicine of to-day to be superior to any indigenous school. Yet after seventy years of experience of practitioners trained on the same lines in this country, many educated Indians and the great bulk of the population of India are not converted to this belief. Religion, the strength of tradition and political considerations all account to some extent for the failure to convert the people of India to the superiority of modern methods in medicine. (I purposely do not speak of any special school or system of medicine because at the present day the modern school of medicine is prepared to accept and incorporate in its own teaching any proved facts of value.) I believe however that the main factor in this failure to convert the masses, is their actual experience of modern medical practitioners. To the bulk of the population the representative of modern medicine is the district or municipal dispensary, in charge possibly of an assistant surgeon, but more often of a sub-assistant surgeon.

If I were asked to select a disease in the tropics to prove the efficiency of modern methods, I would select malaria. Its diagnosis with a microscope is easy and certain, its treatment well defined and simple, and the result of treatment rapidly obtained. What then is the experience of the *ryot* when he applies to the representative of modern medicine for the relief of malaria?

My former district is a malarious one, and the principal disease treated in it is malaria. I investigated the records of four typical dispensaries and the experience of 698 patients with malaria. The results are as follows:—

One attendance	48 per cent.
Two attendances	20 per cent.
Three attendances	12 per cent.
Four attendances	8 per cent.
Five attendances	4 per cent.
Over five attendances	8 per cent.

These figures are for all four dispensaries, but when worked out for individual dispensaries they were found to be practically the same. Where a patient attended over five times there was as a rule some obvious

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explanation. Thus out of three cases at one dispensary, one was the medical officer's son, one the dispensary servant, and the third the station-master's son. In another dispensary out of eleven cases registering over five attendances, five cases belonged to the family of the postmaster living a few yards away, two cases had, from the start, been represented by friends, and may not have been malaria, while two more had registered over twenty-five attendances up to the point I followed them, and I think we may assume they were not malaria. What do these figures prove? To the cheerful optimist that 48 per cent. were cured by one attendance and 20 per cent. by two. To the pessimist 48 per cent. never came back because they concluded that it was not worth the time and trouble. Where lies the truth? We may be guided to a correct conclusion by ascertaining the treatment these patients received.

On enquiry I was informed that each case was given three doses of the stock quinine mixture, *if he brought a phial.* If he did not he got one dose. There was no provision to give the patient a phial. If the patient came from a distance he got six doses, but that was only if he specially appealed for it. I gained the impression that this was more an answer to my question than a fact. The stock mixture of the dispensary pharmacopœia is ten grains of quinine to the ounce, but in three out of the four dispensaries it was only made up to half that strength, the reason being that the quinine supply was not sufficient to last the year if made up in the official strength. An analysis of one of these stock mixtures further revealed the fact that it only contained three grains to the ounce.

From the above facts I think we may safely conclude that at least 92 per cent. of patients suffering from malaria received insufficient quinine to cure their malaria and that some of the remaining 8 per cent. were not cases of malaria and so were not cured.

Is it to be wondered at that the people have little faith in modern medicine? It gives them little more than the Ayurvedic system and a good deal less than some patent medicines for malaria.

Recent observations go to prove that 30 grains of quinine in solution daily, given for three consecutive days, will cure 43 per cent. of cases of benign tertian malaria. Relapses occurred in the remaining 57 per cent., but in the great majority of these cases the parasites and fever either disappeared spontaneously or as the result of one more three-day course of quinine.

Surely we can so organise our medical relief that each case of malaria shall receive 90 grains of quinine in solution when he visits a dispensary? It is not reasonable to expect a malaria patient to walk several miles daily to obtain 15 grains of quinine. Even when he does do so, he may only get 9 grains as the recent analysis shows.

Why are these inadequate quantities given? Primarily the difficulty is one of finance. To take one of the dispensaries investigated, its requirements in quinine at 90 grains per case would cost Rs. 720 per annum. Its total budget allotment for drugs, medical and surgical requisites, etc., is Rs. 500 per annum. It actually spends on quinine Rs. 288 per annum, and receives in addition quinine to the value of Rs. 144 from the Public Health Department; a total of Rs. 432 per annum. There are some dispensaries better than this and some worse, but all are in the same position as regards finance. We must also remember that adequate treatment would result in an enormous increase in attendances.

We come now to the second factor in our failure to convert the people to a belief in the superiority of modern medicine. Are the medical officers in charge of these dispensaries good representatives of modern medicine?

Three of the dispensaries have been supplied with good microscopes. One of them was in use when I inspected the dispensary, the medical officer being a graduate of the Calcutta University. In the case of the others the microscopes were locked away, and the medical officers frankly owned that they did not know how to use a microscope. Is there not something very seriously wrong with our system of medical education and examination when we find a registered practitioner in a tropical country unable to make use of a microscope for ordinary clinical work?

The latest development in medical policy in Bengal is the starting of medical schools in various districts, and the utilisation of the Sadr hospitals for training sub-assistant surgeons. Is this a sound policy? I venture to think not.

With ten candidates applying for every vacancy in the Calcutta Medical College would it not be better to extend the opportunities for training to university standards? Granted enough graduates are turned out, economic pressure will drive them out into the districts. The sub-assistant surgeon was originally trained to work under supervision. His very title implies that. At the present day he is being put in independent charge, and although a limited number are doing well, the vast majority are not, if judged by the standards of modern medicine.

Nor are our Sadr hospitals suitable training-grounds. We must remember that a student's training-school represents to him the highest ideal to which he must work up to. Are any of our Sadr hospitals even representative modern hospitals? We have only to think of their limited staffs, their unsatisfactory buildings, their poor sanitation, their poor equipment, their lack of special departments, their almost absolute lack of nursing

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to realise that they are not. Can anyone compare, say the hospital at Chinsura, with one of the provincial teaching hospitals in England, such as Manchester or Newcastle, and not realise how inadequate it is to turn out satisfactory representatives of modern medicine?

Starting with a good general education, studying in his own language, and with a knowledge of chemistry and physics, the General Medical Council of the United Kingdom has laid down that five years is the minimum period in which a student can acquire a working knowledge of modern medicine. Even then it is complained that the curriculum is overcrowded and that extra time must be spent on tropical diseases, if the graduate is going to practise in the tropics. Starting as we do in India with a poorly educated student, whose text-books and teaching are in a foreign language, can we aspire to achieve that minimum in the same period, or less? The scattering of these under-trained medical practitioners over the country is I believe undermining what little faith the masses have in modern medicine, and paving the way for the revival of the indigenous systems of medicine.

It was Flexner who pointed out that in the big towns a bad doctor could make his living, but not in the country. In the town his mistakes were not common knowledge, but in the country every one heard of them. The theory that the poorly-trained doctor will be content to stay in the *mofussil* villages, will, I think, prove incorrect. He will make his small income more easily in the towns.

THE FUTURE OF ANTI-MALARIAL RESEARCH.

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and
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'Go where Death's pickets hide—
Unmask the shapes they take,
Whether a gnat from the waterside,
Or stinging fly in the brake,
Or filth of the crowded street,
Or a sick rat limping by,
Or a smear of spittle dried in the heat—
That is the work of a spy.'—*Kipling.*

Introductory—the general need for research.

ALTHOUGH Kipling wrote these lines more than twenty years ago they summarise almost the whole activity of tropical medical research, even at the present day. And his instinctive sympathy for the worker, who, whatever his work, has to contend with the intractability of things or of men, lent him insight.

We are not concerned to describe the ravages of malaria since these are already well known: but a correct idea of their magnitude is necessary in order to appreciate the possible value of research, considered as an investment which will diminish them. Malaria extends round the world, being found in places so far north as the Baltic, and so far south as Natal. Far from being confined to the tropics, as is well known, many parts of Southern Europe, notably Italy and Greece, contain foci of virulent infection. In a recent address Dr. Andrew Balfour has estimated that the annual death roll from malaria is 200 millions, and that the annual loss to the world which it occasions is between 50 and 60 millions sterling. These figures are certainly not exaggerated, since in India alone one million three hundred thousand persons died of malaria in 1920, and it has been estimated that in 1923 there were ten million cases in the Russian dominions. The disruption and delay caused by the death and sickness of labourers occasions incalculable loss to organised industries, and even to agriculture, since neither ploughing nor reaping wait upon convalescence. Apart from the misery and loss occasioned by actual sickness and death, the invalidism caused by chronic malaria robs inspiration, and by depleting vital energy, levies a heavy toll upon both European and native initiative in the tropics. Therefore without reference to humanitarian considerations, and using an expression derived from the clarified preceptions of finance, the "present value" of any discovery making it possible to eradicate malaria, or even considerably to increase the ease, and diminish the cost of dealing with it, would amount to hundreds of millions of pounds. Yet only a few thousand pounds a year are spent on malarial research in the Empire. There seems to be no escape from the dilemma, either that practical men are not really practical in their dealings with malarial research, or that there is very little to be hoped from it.

This supposition involves two alternatives, namely either that research is bankrupt, and that money spent on it must therefore necessarily be money wasted: or that existing preventive measures are so nearly perfect that no better are needed. We believe that the last supposition is almost the exact opposite of the truth. This we will briefly proceed to show, devoting the remaining pages to a discussion (necessarily limited) of the enormous possibilities of anti-malarial research, organised on a world, or at least on an Empire-wide scale, and carried forward unflinchingly, with bold and wide-ranging initiative, under enlightened and really scientific guidance.

The defences against malaria are twofold. Either the parasites which cause it may be

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attacked and killed while they are in the blood, or attention may be directed to getting rid of the anopheline mosquitoes which transmit them from man to man. The reader may be reminded that the word malaria stands for a trinity of ill, there being at least three different species of parasite, namely that of quartan, that of the much commoner tertian fever (the so-called "benign"), and that of the sub-tertian (or "malignant") form.

Despite the fact that over 900 synthetic drugs have been tested on syphilis, and over 200 on sleeping sickness, anti-malarial research on these lines has received much less, and much too little, attention. The result is that quinine, in one or other of its modifications, is still the remedy at present in almost universal use. The history of quinine treatment, summarised by Dr. William Fletcher in his reports from the Institute for Medical Research of the Federated Malay States, is a curious one.

As everyone is aware, the medicinal value of cinchona bark, which was introduced into Europe by the Jesuits in the sixteenth century, was discovered by the Indians of Peru. This discovery, like that of oiling, is therefore pre-scientific. Quinine, which is but one of the alkaloids present in the bark, is obtained by an elaborate and costly process of purification, which is largely unnecesary. For though it is true that some of the other alkaloids are harmful if they are prescribed in excess, others, rejected without cause, are proving of even greater value than quinine. And as long ago as 1866 a committee appointed by the Indian Government reported that the much cheaper cinchona febrifuge was as good an anti-malarial remedy as quinine. In spite of this fact, the only species of cinchona now grown is one which was selected because of its richness in quinine, and it is difficult to grow in many parts of the Empire suited to other species, with the result that its cultivation is almost confined to the Dutch East Indies.

Quinine, although the best available drug, is not a perfect one. To quote Dr. Fletcher, "Stephens found that 54 per cent. of his series of benign tertian cases relapsed within 21 days" after having been given 20 grains or more of quinine daily for four weeks; and he records that Acton found that 75 and 80 per cent. of benign tertian and quartan cases respectively relapsed after thorough-going quinine treatment. But a still greater objection to quinine is that its cost is prohibitive. The Dutch growers have restricted production for several years past because the people in malarious countries are too poor to buy quinine: and few Governments can afford to distribute it free, and none have so far been able to devise means for its effective distribution and long-continued consumption by the people in the large quantities necessary. In the meanwhile a sub-committee of the League of Nations has been considering means for cheapening quinine. But Dr. Fletcher has confirmed the old belief in the efficacy of the much cheaper cinchona febrifuge, prepared from the crude bark, and finds it even more efficient than quinine against quartan, while Major Acton in India found it superior for the treatment of benign tertian fever, a result he attributes to the presence of the alkaloid quinidine. What is wanted, however, is a cheap and much more powerful specific, able rapidly to eliminate the malarial parasites from the blood of a whole population. If this could be done, malaria should cease to exist. It could be abolished by simple administrative action comparable to compulsory vaccination. For if the parasites in the blood of a whole people were killed and prevented from re-establishing themselves, by the conferring of complete immunity on the population for a period only as long as the life of a single generation of mosquitoes, malaria would be stamped out.

A million pounds (and a very small fraction of this might suffice if it were expended directly, and not invested) spent upon the discovery of such an agent (be it a serum, vaccine, jungle herb, synthetic drug, unknown ray, or something as yet entirely unimagined) would repay itself scores of times over in twenty years.

The malarial problem is full of seeming contradictions any of which when resolved by investigation may shed a flood of light upon the causation of malaria. Why for example has the disease to all intents and purposes died out in England, although two of the most dangerous carriers, *A. maculipennis* and *A. bifurcatus* are still abundant? Even more strange, if true, is the rarity of locally contracted malaria in Kashmir, where not only are the appropriate mosquitoes present, but also convalescents from the plains of India, many of whom must harbour parasites in their blood. All that is comprised under climate and topography, including humidity, temperature, and altitude, possibly even electrical conditions and their direct effects upon man and the mosquito, as well as indirect ones exerted through local vegetation, micro-organisms and food supplies, makes up an interwoven tangle of cause and effect, which serves to illustrate the complexity of the malarial problem, and the need for penetrating study of it on the spot. This is being carried out by Colonel Gill, whose pronouncement will be awaited with interest, for every local problem carried a step nearer to solution clears the horizon, and affords clues which may be helpful elsewhere.

Turning to the available methods of mosquito-control, the protection they afford against adult mosquitoes is admittedly very inadequate. This is proved by the fact that

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when mosquitoes are at all numerous we are forced to screen the doors and windows of houses, or to take refuge within mosquito-nets. Apart from the possibility of fumigating small closed rooms, the destruction of winged mosquitoes is compassed by swatting or capture by hand, or by the precarious use of darkened but unbaited traps. Since no bait with the power of attracting mosquitoes through their sense of smell is known at present, traps are ineffectual during the hours of darkness when most species are on the wing. On the other hand repellent substances, besides being fugitive in their action, are unpleasant for the user, and often cause him more inconvenience than they do the mosquito.

Despite the growing popularity of copper arsenite and other powders, the oiling of their breeding waters is still almost everywhere relied upon for the destruction of larvæ and pupæ. Strangely enough the employment of oil for this purpose ante-dated Sir Ronald Ross' discovery by more than eighty years, the first known reference to it, according to Dr. M. E. Barnes of the Rockefeller Foundation, being in a London publication of the year 1812. The discovery of the efficacy of oil, like that of the cinchona, is therefore a pre-scientific one. Whether or not its continued use at the present day is to be regarded as in any sense a reproach must be a matter of individual opinion. The mode of its action, partly by suffocation and partly by poisoning, has at last been elucidated, and the cause of its spreading over water explained; while improved oiling fluids have been discovered.

One of the chief disadvantages of oiling is that it must be repeated at intervals of every few days, and be carried out under expert supervision. These facts necessarily render the process costly.

Rubber estates, almost alone among agricultural lands, have proved profitable enough to provide for the necessary expenditure. In very many of them oiling is resorted to, either of free choice as the lesser of two evils, or under Government compulsion; and tens of thousands of pounds are spent annually with far from completely satisfactory results.

The only serious rival to oiling is sub-soil drainage. Both alike are so costly that there is not a shadow of chance that they will ever be applied to anything but an insignificant fraction of the vast tracts of land infested by malaria all over the world. Kuala Lumpur, the Federal Capital of the Malay States, with a population of between eighty and a hundred thousand, is an example of what can be done by the highest engineering skill, coupled with expert and slowly acquired knowledge of the breeding habits of the local mosquitoes. Malaria has been almost abolished in the town by open and sub-soil draining of about ten and a half square miles, carried out under the supervision of Mr. F. D. Evans at a capital cost of over £60,000, and a yearly maintenance charge, exclusive of the cost of oiling the open drains, of over £2,300 per annum. It is rightly urged that by a no means negligible portion of this expenditure is covered by increase of land-values and of rents. This, however, is an argument only applicable to towns, and by no means answers the question where anything like £6,000 capital expenditure, with a recurrent annual charge of over £200, per square mile, is to come from anywhere else.

Leaving the considerations of anti-malarial measures as they are at present carried out, let us glance (for no more is possible) at the problems with which research is confronted. Only certain species, of only a single genus, *Anopheles*, have been proved to carry malaria. The work of classification, which was undoubtedly the pre-requisite of further advance, has now been well nigh completed; and, whereas at the beginning of the century only fifteen species were known, the genus now contains a hundred and twenty-seven. The devoted labours of busy medical men the world over, assisted by only a few professional entomologists, accomplished pioneer work in this direction, as in determining which are the dangerous species, and in investigating their breeding places. Doubtless a very great deal yet remains to be discovered, especially in respect to the possibility that many as yet unstudied species of anophelines may carry malaria. But in spite of a lamentable scarcity of investigators, this work is well started, and may be trusted to proceed on well-known lines.

The influence of the female mosquito's food, which besides blood, consists mainly of fruit juices, upon its power of transmitting malaria, has yet to be studied. In the case of larvæ we know very little about what they feed on, and nothing at all of how they digest their food, what they will tolerate, and what will make them sick. But research is beginning to make it certain that the larvæ of different species differ radically in their requirements and tolerances. Yet all are attacked alike, and their suppression atempted by methods which, if effective, are, as has been seen, extremely costly, and can only be described as crude.

What is needed is a cheap method of treating breeding waters, possibly the slow and chemically regulated solution of some direct poison which will destroy either the larvæ, or associated organisms upon which their existence may depend. Much more water, and wider areas, could be treated than by present means, because they would require to be visited much less frequently, and the tendency would be for mosquitoes to die out of regions which were worked intensively. For the eggs necessary to start new broods

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must come from adults, whose span of life and power of migration are alike small. In any case the insect's recruiting power would be lessened automatically and independently of accidental failure to carry out weekly oiling, and the victory achieved would be on the lines of the higher strategy, enabling a few trained operators, travelling from place to place, to do the greatest possible amount of good.

But the possible means of destroying mosquitoes, and their larvæ, are very varied, and what is wanted may in many cases exist free of all cost where it is most needed. Some years ago Sir Malcolm Watson suggested that the effect of contamination of mosquito-breeding waters by the waste products obtained in the process of rotting out fibres, etc., might be to check mosquito-breeding. Research fully confirms this supposition, and wide areas under rice in Malaya are practically free from anophelines owing to the presence of underlying peat. Methods of control which utilise not costly manufactured chemicals, but cast-away products of mining and of industry, should everywhere be tested. To the biologist it is almost unthinkable that mosquito larvæ could develop healthily in any highly mineralised water. Their vital adjustments are too delicate; and they, and the organisms upon which they feed or are in other ways dependent, are racy of the soil. The ultimate test of poisons such as these must be in the field, and in strengths which, with a margin of safety, will just destroy the broods before the adults hatch out. Laboratory experiments dealing with high concentrations of poisons, often dangerous to man, and which kill larvæ in a few hours, do not give all the information which is needed for the ideal process, which will work continuously and abolish mosquito-breeding with the lowest effective concentration of substances harmless to men and animals, and, if possible to fish as well. Nature does this in her biochemical laboratory everyday.

Waters of the most diverse kinds (waterfalls, cesspools, rain-filled tree-holes, and the accumulations in pitcher plants) abound with the larvæ of different species of mosquitoes. Why is this? It is notably true of individual species of the genus *Anopheles*. The larvæ of each species is found only in its own chosen types of water, and in its own favoured haunts, some in swiftly running streams, others in contaminated puddles, others again in the mere film of water which seeps from hillsides barred to the tropical sun, and yet others in the quiet darkness of the hollow centre of a bamboo, the only access to which for rain and mosquito alike is by the tunnel of a boring beetle. But what from the anti-malarial standpoint is even more suggestive is the fact that there are numberless waters, some small and precarious, and others permanent and of vast extent, where the most diligent search fails to discover a single larva. As every field worker knows, it is quite a mistake to suppose that most waters breed dangerous anophelines. The contrary is true, for, as we have just seen, each species requires its own peculiar water, and its own special environment. Moreover, wherever a survey has been carried on over a period of months it has been observed that the amount and character of mosquito-breeding fluctuates. How much would we not give to know the reason for the spring-time abundance of the oriental *Anopheles maculatus*, responsible for the May epidemics of malignant malaria in plantations in the hills of India, Ceylon and elsewhere? Is it due to some inherent trait in the mosquito, or to some small and controllable variation in the water, or to the prevalence in it at this season of a minute alga or infusorian, which provides nourishment for the larvæ, and whose inopportune entry upon the scene might, with a little more knowledge, be denied?

Since MacGregor first drew attention to the subject, the relation between the hydrogen ion concentration of natural waters and the distribution of anopheline larvæ has been the subject of enquiry in a number of countries. But there are other chemical factors calling for attention. Though in America Purdy has been unable to trace correlation between the distribution of anophelines in certain rice fields and the chemical constitution of their waters, as revealed by quantitative analyses, in Malaya the facts brought to light by Hacker, the full details of which have not yet been published, taken in conjunction with Blair's analyses go to show that the seasonal prevalence of *A. maculatus* is associated with various chemical factors present in its breeding water, which in their turn are related to rainfall; while more recently, both in Ceylon and Malaya, correspondences have been traced between the presence or absence of larvæ of particular species of anophelines, and the amount and nature of the substances dissolved in the water, especially those of organic origin. All this work requires to be repeated and greatly extended in the light of the experience already gained; for it opens up the possibility of entirely new methods of mosquito-control. Yet in most countries chemical research is not recognised as an essential part of anti-malarial investigation, nor conceded any claim at all to recognition.

Can this neglect, and the neglect of research in many other fields, where its usefulness is hardly questionable, be justified? While it continues we must not grudge the sanitarian and the anti-malarial engineer the prodigal sums they have to expend upon defensive measures limited to narrowly circumscribed areas. But properly directed research, by pointing the way to economy, must in the

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end greatly extend the range of effective control over dangerous mosquitoes. It is not so much money as effective organisation, based upon realisation of the needs of research, that is wanted. We are therefore tempted to try and state our view of what these needs are, speaking primarily as biologists.

Justification of the biological outlook and the need for biochemical research.

Disregard of the biological outlook sometimes tends to false simplification of vital problems, but the malarial investigator is more often impressed by the numberless uncertainties and difficulties connected with his work; and, perhaps through imperfect acquaintance with the possibilities of biological research, even in its present stage of development, he is apt to acquiesce in its neglect.

The mosquito is thus relegated to the status of a *corpus vile*, to be slain with any empirically forged sledge-hammer that comes to hand, rather than regarded as an elusive entity, requiring profound and patient study for its management and mastery. And the same attitude of mind is shown, though with greater justification, in the neglect of the much more difficult field presented by the experimental study of the malarial parasites. But a science such as biology, which has already attained to the command of methods which have resulted in the chemical fertilisation of ova, the control of growth and development by endocrine feeding, and tissue culture, in diverse phyla of the animal kingdom, and which has demonstrated the dependency of the larvæ of the fly *Drosophila* upon a particular protein derived from yeasts present in the fruit they feed on, is justified in the hope that if it is given fair opportunity, it may contribute decisive aid to the suppression of insect-borne diseases. Merely empirical knowledge, however, is no longer enough. Complexities must be unravelled, and hidden causes must be traced and brought to light, with the help of every available refinement of technique.

It is desirable to recall that both logically, and probably also from the point of view of the ultimate eradication of malaria, the experimental investigation of the malarial parasites claims precedence over that of anopheline mosquitoes. But the physiological reactions of the parasites to drugs and other agents which may disturb their normal economy, complicated by interactions between the drug, if present, the parasites, and the tissues of the hosts, whether insect or man, constitute so formidable a group of problems that even their proximate solution will depend upon the progress of biochemistry. It may have to wait the development of a technique permitting the detection, if not the quantitative estimation, micro-chemically, of minute traces of the reacting substances, even the general nature of which is at present unknown.

The key to the control of mosquitoes as well as that of the malarial parasites must be sought in a knowledge of their normal life processes. Hitherto both anti-malarial therapeutics and measures for the destruction of mosquitoes have largely disregarded this truth, basing practice upon records of mere survival or death in the presence of drugs or larvicidal agents. Though justified by immediate expediency, this procedure promises neither complete practical success, nor the acquisition of ultimate knowledge of basal principles. And it is not in the full sense of the word scientific, for it builds up no interconnected body of knowledge. Through its neglect to seek out their causes, the phenomena recorded appear as isolated facts, and future investigation is left in doubt where to turn and what new practical expedients to test. It is therefore evident that the key to the control alike of the mosquitoes and of the malarial parasites is to be sought in a knowledge of their life processes; and until we understand these in their normal manifestation, we cannot attain to an understanding of the effects of destructive influences, nor increase their efficiency by combining or modifying them in accordance with already ascertained principles.

Turning to the anopheline mosquito, the investigation of its whole physiology from egg to adult is of first-rate theoretical importance. And many of the problems which present themselves for enquiry are also of immediate practical significance. The importance of bionomic studies defining the conditions of life suitable to different anopheline species has already been widely recognised. But the explanation of the connections, already observed or to be discovered, between anophelines and their food, or the chemical factors of their environment, is to be sought in a knowledge of their physiological and biochemical reactions: so that bionomic studies are strictly speaking less fundamental than physiological researches.

Not much need be said about the eggs of mosquitoes beyond pointing out that their powers of resisting solar radiation, desiccation, heat, and burial in mud, are all dependent upon innate physiological properties, including hygroscopic permeability, the need for oxygen, and permeability or impermeability to toxic substances such as poisonous gases or solutes, given off, or present in, the water or soil. The fact observed by Bacot, that the eggs of *Aëdes argenteus* (*Stegomyia fasciata*) are dependent for their hatching upon bacterial stimulus, also calls for physiological explanation. Investigation of the physiology of the adult mosquito is chiefly needed because it must sooner or later lead to an understanding of the supremely important

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factors which permit the development of the malarial parasites in certain species only of anophelines, the ability of which to carry malaria seems to vary in different countries, and may be largely dependent upon environmental conditions. Even the possibility that there may be culicine mosquitoes whose digestive and body fluids resemble those of proved malaria carriers, and which are therefore themselves able to transmit malaria must not be entirely excluded.

The larval and pupal stages of development evidently possess a special practical importance owing to the comparative ease with which larvæ and pupæ may be located, and dealt with. As already suggested, in order to understand the mode of operation both of artificial larvicides and of natural agencies destructive of larval life, the normal physiological functions and requirements of each species of anopheline larva must be investigated. In the meantime the bionomic relation of larvæ of different species to their special environments requires much more detailed study than has yet been given to it, the chief points at present requiring elucidation being:—

1. The direct effect of elusive chemical factors, and of physical influences, such as the intensity and the quality of light radiations, upon larvæ in their natural habitat, and in the laboratory.

2. The influence which these factors exert indirectly, by acting upon the microbic, infusorial, and algal life of the waters, some of whose forms are beneficial, and others harmful, to mosquito larvæ.

The accommodation between one form of life and others is nowhere more finely adjusted than in natural waters. The balance may be upset by a hair-trigger, the lever of which is the micro-organism, broadly defined to include all categories, whether algæ, bacteria, or protozoa. By reason of the extreme tenuity of their exterior membranes, which are often less than one hundred thousandth of an inch in thickness, these organisms are much more susceptible to chemical influences than are mosquito larvæ themselves. Not only do some of them spread infectious disease (and the diseases of mosquito larvæ are an almost unexplored field of knowledge), but, as has been hinted, they may form an important part of larval food, as they, and the minute crustacea inhabiting both fresh-water lakes and the sea, do of the food of fish. The study of this floating life, or plankton, is a recognised department of fishery research, and its methods are as refined as the scale on which it is carried out is liberal, both far surpassing the wildest dreams of the anti-malarial investigator. One of the writers is glad to acknowledge his indebtedness to these researches and to the inspiration they have been to him, as well as to record his gratitude to the Royal Society for a small grant enabling him to become possessed of a single piece of specialised apparatus for water analysis, probably the only one of its kind used in anti-malarial research. By its aid several doubts have already been resolved. But who might not envy the equipment of, for example, the lake-side Laboratory of Wisconsin, which permits the collection of the most minute organisms in quantities sufficient to afford material for chemical analyses? These investigations have been extended, mainly in the spirit of pure research, to the fresh waters of Germany, Denmark, and the United States. In the British Empire enquiry is chiefly concerned with marine investigation, prompted by the desire to increase our food supplies. This aim is beyond cavil, but is it not at least as important to prevent sickness as to increase food supplies? It is of course only natural that the majority of anti-malarial workers, already overwhelmed by the ever-increasing volume of literature with which they must acquaint themselves, should have overlooked obscure but precious publications in the journals of marine and fresh-water biology. But it is a fact, the inner significance of which is rather puzzling, that while hard-headed business men, and cautious statesman, have for the past twenty or thirty years been convinced of the urgent practical need for studying the minutest microscopic details of the food of fishes, and have provided the money and the men to do so, the idea that any such need exists in connection with mosquito larvæ would probably be regarded as rather whimsical by many of those who direct anti-malarial research in the British Empire. But in the United States a plankton expert has for many years been investigating anti-malarial problems for the Department of Public Health.

Fortunately, given time, patience can overcome many of these difficulties at no cost at all. For by its method of feeding, the anopheline larva is the best imaginable collector of the surface plankton, though needless to say on a very small scale, too small to meet the needs of quantitative chemical work. Nevertheless, the contents of the larval stomach when isolated (no very easy matter in the case of young larvæ), and examined under a powerful microscope, reveal a treasure-trove, requiring all, and more than all, the knowledge that even a specially trained worker possesses, for the classification of its various constituents. Two or three hours may easily be spent upon a single larva in this way. The next step should be the cultivation, in pure strain, of judiciously selected samples of the organisms which the water contains, and the study of their effect, beneficial or the reverse, and especially perhaps of their nutritive efficacy, for various species of larvæ. Every bacteriologist

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will realise the demands upon time and labour entailed by the care of an accumulating series of pure cultures, which have to be continually renewed if they are to be kept alive, and tested in the ever-varying conditions which may be suggested by the research in progress. The difficulties are tenfold increased, when, as in the case of many aquatic organisms, the conditions under which they will grow at all have to be the subject of preliminary, and often prolonged, investigation. With the present organisation of anti-malarial research in most countries, such work is all but impossible. For those who might undertake it are burdened with peripatetic duties, either administrative, or in connection with the collection of epidemiological data over wide areas. It is true that in India and in the more enlightened Colonies there are research institutes, and to the needs of these we will devote a few concluding words. But we have not yet quite done with micro-organisms as they affect the life of mosquito larvæ.

Their most potent influence is chemical. At least this is true of the bacteria and moulds which transform rotting leaves and other debris found in the water into soluble substances which have the profoundest influence upon larval life, absolutely inhibiting it in certain cases, or, as is more usually the case, rendering particular waters suitable for only a few specialised types of larvæ. Bacteria, besides being the arch-chemists, are the scene-shifters of Nature. Among innumerable other activities, they set and furnish the stage upon which mosquito larvæ play their part; and forbid them entry when the stage is set for others. Their indirect effect in favouring or forbidding the friends, or in fostering the foes, of larvæ, may in many cases be more potent than the direct influence upon larval life of the chemical substances which they fabricate. Although these substances are roughly classified by the analyst under such headings as "peaty acids," "albuminoid nitrogen" and other general categories, these names conceal an almost total ignorance of the inner constitution and intimate properties of the substances named. And these are what matter. For we are brought up against such facts as the occurrence of the larvæ of the Malayan *Anopheles umbrosus* in water impregnated by jungle peat, while it is absent from the equally, but differently, peaty water of certain rice fields. The whole process of leaf-rotting (and of rotting in general) therefore needs to be studied, both in its bacteriological and its chemical aspects, in order that the lessons learnt may be applied to the control of this and other dangerous species. Nor do bacteria confine themselves to the breaking up of organic substances. At one point in both the iron and the sulphur cycles, primitive types intervene, and effect the oxidation of poisonous ferrous salts, and of sulphuretted hydrogen, respectively, thus favouring, though not always achieving, the salvation of the larvæ. Nor are bacteria the only micro-organisms which are able to effect the transformation of iron. The possibilities which these and allied phenomena open out, of controlling mosquito-breeding over wide areas, and without recourse to expensive chemicals, surely justify their being studied in detail and being accorded recognition as legitimate departments of anti-malarial research.

Needless to say these investigations should not be carried out to the exclusion of the technical and highly skilled research required to elucidate the physiology and biochemistry of the different species of malarial parasites in relation to human immunity, the effect of drugs, and clinical conditions. And in entomology there will always be work for the naturalist bent upon bringing to light the instincts and manner of life of mosquitoes, and of their natural enemies.

The Organisation of Research.

Taking all these needs into consideration, and allowing due weight to the necessity for uninterrupted and continuous investigations, an institute for anti-malarial research must be amply staffed and adequately equipped, so as to provide for the carrying out of refined experimental as well as microscopical work. Work calling for specialised activity in half a dozen sciences cannot be carried out by only one or two men. This was just possible so long as field observations and the collection of epidemiological data constituted the main endeavour. But such work often entails long absence from a laboratory and is incompatible with protracted experimental researches, which require continuous attention. Therefore at least one epidemiologist skilled in spleen and blood work, and who in the natural course of things will be a medical man, must be included in the staff; at least one micro-biologist, an entomologist, and a research chemist able to isolate and elucidate the reactions of the numberless unknown compounds of organic origin which permeate natural waters. If in addition he is a trained biochemist this will be all to the good. All these categories of workers might properly be duplicated, especially in tropical countries, where ugly blanks in the continuity of experimental investigations are liable to occur owing to long absences on leave of those who have started them. Professor Warrington Yorke of the Liverpool School of Tropical Medicine, addressing the recent Imperial Entomological Conference, in reference to sleeping sickness, pointedly remarked:— "Even work admirably conceived is often brought to naught by the fact that those who are conducting it go on leave without arrangements being made to carry it on ..... the initial excellent

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work is thus rendered useless, and knowledge, or shall I say ignorance, remains *in statu quo*." Even this degree of disorganisation, however, is infinitely better than for one or two men to spend their time rushing about, meeting urgent, or supposedly urgent, demands, under conditions which preclude all serious experimental work, and therefore all real progress. They probably earn their salaries, but not as research workers; and this is hardly honest towards the community which believes that it pays them for their skill in investigation, nor very fair to the men themselves. But in order to carry conviction on the main point we are content to state the minimum needed for carrying out anti-malarial investigation on anything like an extensive enough scale. And be it added that one or more of the most enlightened colonial Governments are providing the men, but the specialised and diverse training that they require is not always realised, nor is the bewildering complexity of the task that awaits them. We may therefore be pardoned if we labour this point a little further.

A single epidemiologist, concerned with routine blood and spleen examinations, will have little time for real research in his own subject, whether on biochemical or microscopical lines; but he should have the aptitude and training needed for this work, so that he may do it whenever the opportunity presents itself. The water chemist should, apart from ability to conduct preliminary routine analyses, be able and keen to investigate at least the proximate chemical causes of the total biological properties of the various waters in which mosquitoes breed. He should, for instance, be prepared to track down the particular acids and bases, either already known, or, for the most part, awaiting discovery, upon the presence of which their hydrogen ion concentration depends. For it is their precise nature, quite as much as upon the resultant reaction of the water, that probably determines the character of the microbial fauna and flora. And probably the particularities of the micro-organisms determine, at least in part, what, if any, mosquitoes will breed in the water. Here the microbiologist steps in to test each theory, and by the chemist's aid to regulate the equilibrium of life to the desired end, namely, the suppression of mosquito-breeding. The instructed reader will already have smiled at the word microbiologist. Outside the rank of writers of text-books (the best of them compiled by a syndicate of specialists), he hardly exists, even in name. And these text-books practically ignore aquatic organisms, most of which in the tropics are yet uncatalogued. Algæ are not mentioned in the standard works dealing with microbiology! In England if a man knows his diatoms he is, in his own purblind circle, respected. A mycologist is a mycologist, and does not lay claim to be a bacteriologist; and a protozoologist, able to deal with all comers among the riotous denizens of every disreputable pond and ditch, is not found in every university. As compared with routine bacteriology, that of natural waters, and of the soil they overlie (the microbically induced chemical changes in which appear to be most important in the case of peaty, and perhaps of ferruginous soils) deals with hundreds, if not thousands of species, instead of a few selected ones. How few of all these forms of life, it will be objected, can have any effect upon mosquito breeding! True, but that does not render the detection of those that have any easier. The difficulty is in the pounce, haling out the criminals, and putting in the way of wider well-doing those that already go about it unsuspected. But let us be contented with a microbiologist, a man with a plaguing pen, and the habit of sending out litle tubes all over the world to be christened by the orthodox Latin and Greek rites. Sometimes the two orthodoxies get mixed in the same mouthful, and then he has to send the hybrid cognomen to his classical friends for them to submit to the test of taste, and tell him what it is all about; but their replies may only darken wisdom. In the meantime he will be well content to call whatever it relates to X|231 of the something-or-other-*aceæ* and set to work with it, while preparing his mind for multi-partite fission in any direction at a moment's notice, at the call of the next emergency.

To save the entomologist from this fate, better befitting the microbic brain, there might be two of him, one dealing with all the problems of medical entomology, and especially all that concerns the minutiæ of the scores of species of mosquitoes found in tropical climes; while the other investigates the problems of general entomology which relate to the mosquito, such as those dealing with mosquito-destroying insects. This is an entirely practical suggestion, since many of these insects are extremely destructive to larvæ, and it should be possible under expert supervision to breed some of them such as "water-boatmen" in mass, and to stock such places as fish-ponds periodically with their eggs. These ponds are a pestilent source of annoyance, if not of malarial infection, in the Chinese quarters of some of the towns in Malaya, owing to the fish being either of the wrong kinds, or too well fed by their Chinese owners to make any impression upon the hosts of anopheline larvæ the ponds contain. Oiling is difficult, and seldom, if ever, attempted in these ponds; and there appears to be no reason, when the necessary knowledge concerning the breeding and acclimatisation of these insects has been gathered, why they should not be enlisted, and at the most trifling

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cost, to do the work that Nature herself has allotted them. But this would require the accurate adjustment of means to this end, and experience derived from long and careful observations. If the water to which they were transferred proved harmful to the insects the advice of the chemist might have to be sought: and if they sickened of fungoid or bacterial disease, that of a mycologist or a bacteriologist.

We have not yet enumerated all the branches of knowledge which the malarial investigator must lay under contribution. Who for example is to diagnose the mites which infest mosquitoes? And where is the botanist to be found with an intimate knowledge both of the local flora, and of the breeding places of local anophelines, who will be able to say at a glance whether this or that place is likely to be dangerous? For there is no doubt that there are plants which are useful indicators of calcareous, peaty, and other types of soil, associated with particular species of anopheline larvæ, and yet others which convey a warning that spots which happen to be dry at the time of inspection are liable to periodic inundation. A knowledge of this might prove valuable, both by saving time when making extensive field surveys, and by guarding against hasty and erroneous deductions. We confess that we do not know how, in a general way, these needs are to be met, nor how the rainfall and other necessary meteorological data are to be obtained when working at a distance from official recording stations, unless the malariologist steps into breach and does the work himself. From the standpoint of research this title is much too comprehensive. But we have no wish to exaggerate difficulties, nor to advocate narrow specialisation. A staff selected on the lines just laid down, even if every by-path cannot be explored, should be able to give a good account of the field of research as a whole. And there is a great deal to be said for companionship in research. For not only is the friendly criticism it brings a corrective to the extravagance and one-sidedness of ideas born in solitude, but intellectual comradeship puts heart into the lonely worker. He is cheered by hearing a new day, to be filled with rummagings of great price, proclaimed from another watch tower than his own. Anti-malarial investigation, perhaps more than any other, needs to be simplified by being shared, for it sometimes seems to stretch like a teeming and shelterless plain extending almost to infinity and requiring exploration in every direction.

In these few pages, the gleanings of a long correspondence conducted overseas, we have not been able to do justice to the work that is being done in various parts of the world, nor even to outline all the possible developments of anti-malarial research. In much of what relates to the properties and mode of action of oils on mosquito larvæ, as well as to the invisible chemical and heat rays given out by the sun, and modified by the atmospheric and other factors, help is needed from advanced physical and meteorological research. But we have said enough to show that if the work calling to be done is to be done properly, its needs must be more fully realised and provided for than has been the case in the past. No science includes so many other sciences as that of medicine; and medical men, besides following their own intricate lines of research with a versatility and devotion without parallel in any other profession, whenever the need has arisen, have done pioneer work in entomology, helminthology, protozoology, and other spheres of knowledge which throw light on tropical diseases. Nor, when convinced of the need, have they been slow to enlist the services of lay scientists, especially of entomologists, though far too few men and women with a thorough training in general entomology are at present working on medical problems. In other spheres, as the case already cited of the need for applying the methods of plankton research to anti-malarial investigation proves, whole departments of knowledge may remain neglected because unknown. We believe that the only remedy for this state of things is a general council of medical research, and one for anti-malarial research in particular, including the best and keenest representatives of *every* branch of science (even geologists and mining chemists, for example, should certainly not be excluded) as well as medical men. Illuminating ideas would be born of the conflict of opinion, and we should less often see the wrong men chosen, the right men thwarted, or technical problems being attacked by methods a quarter of a century old. That this is no exaggeration nor any reflection upon medical knowledge in particular is shown by the fact that botanists were content to magnify the growth of plants fifteen or twenty times until they were taught by Sir J. C. Bose to obtain a magnification of a million by methods familiar to every physicist for the last three or four generations. The facts revealed by this application of physics to the problems of botany were so surprising as to be positively disbelieved for a decade. What similar surprises, fraught with infinitely greater importance to mankind, may not await medical science?

This brings us to a final practical suggestion. The lot of the research worker in the tropics is apt to be discouraging. The conditions under which he works might sometimes be improved. He often feels that he is valued rather by the standards of routine, than by the worth of his contributions to knowledge, if indeed he has time to make any; and that while the talk of the shops, and all it means,

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is denied to him, he is falling behind the times. Therefore the greatest good would follow from giving universal effect to the suggestion, recently made in connection with an Imperial Research Committee on our African Colonies, that British scientists should visit all Colonies and Dependencies every year. If the acknowledged leaders of science cannot always come themselves, let the keenest of the young men, themselves imbued with the spirit of research and familiar with its refinements, carry back their reports. They should, if possible, work along with those they come to help, even if only for a short time; for only so will they learn to appreciate their special difficulties and be able to form plans for removing them. They should constitute an informal liaison between the workers and the scientific authority at home after their return. While this would be their main duty, they would also be able informally to enlighten local authorities as to the value of the work being done, especially if this was on new and little understood lines, and to learn their views. Those thus visiting our Colonies would not be without the sense of good accomplished. Not only would their work be vital for science but vitalising, and its interest would be very great. For the tropics are so full of curious riches, especially in the biological realm, that any one working there can pass on material for investigation by the handful.

The need for more, and much more, knowledge of malaria, which we have ventured to urge, received somewhat striking confirmation while the foregoing paragraph was being penned. A very able malariologist, a medical man whose hobby is research, and who has had many years' experience of preventive work in rubber estates, remarked with just sufficient irony, that he had long ago given up considering malaria a preventable disease. At present, and not for the first time, his hospitals are filled, in spite of the fact that he knows every inch of the drains on his estates, and that he devotes much time to seeing that they are regularly, and if the word can be justified, scientifically, oiled. One knows these major and minor epidemics, many of which are never explained. This is not a satisfactory state of things. As already suggested the remedy is, by the acquisition of fundamental and not merely empirical knowledge of everything relating to malaria and the mosquito, to improve beyond recognition our methods of dealing with both.

In the meantime we must be content, until the dawn, to grope with the torch bearers. But let us be clear about what we should seek, and what are the moral pre-requisites of success. First and foremost is wanted a medicament, or a physiological or physical agent, which will utterly destroy the malarial parasite from off the face of the earth. That is the root of the matter. Secondly, means far more effective than at present exist of ridding ourselves of the mosquito. And, first and last, open-mindedness and generalship to permit, promote, and apply discovery. "The enthusiast," Sir Ronald Ross has remarked, "is rare: the successful enthusiast very rare." Those words convey a warning. For enthusiasm by itself is blind; and success in medical as in other investigations has in the past been determined, and must in the future continue to be so, by imagination, penetration, and sound inductive reasoning. The problem of the organisation of research is to secure their harmonious co-operation. Therefore, save by a miracle of pure intuition, there will be no millennium free from malaria, which is not the creation of thought, free to pursue its patient and sometimes painful progress through a bewildering nexus of facts, the discovery of which calls for labour no less painstaking and thorough. Thus only, like the brain itself, knowledge grows by the elaboration of interlacing strands, till, their circuit completed, light is kindled, to remain an inward possession and a lamp before men's feet.

Current Topics.

The Post-Graduate Hostel, London.

A NEW venture which will be of interest to many of our readers is the opening last July of a Medical Post-Graduate Hostel at the Imperial Hotel, Russell Square, London, W.C. 1. The objects of this Hostel are to provide a central hall of residence for medical men visiting London, a smoking and reading room and a recess in the dining room being reserved for their exclusive use: to promote the interchange of thought among medical men hailing from other countries: to encourage original ideas and work by means of informal discussions: to enable its residents and medical men in London to meet teachers from London, the provinces, and abroad in discussion: to further the work of all existing post-graduate institutions, especially the Fellowship of Medicine: and to foster imperial friendship. Amongst those on the committee of the Hostel are Sir D'Arcy Power, Sir G. Lenthal Cheatle, Dr. Alfred Cox and Sir Thomas Horder.

The Hostel is very centrally situated, being within 400 yards of the new home of the British Medical Association, and very close to many of the London hospitals; also within easy reach of the Royal Society of Medicine. The privileges of the Hostel are restricted to fully qualified medical practitioners, and informal evenings for discussion, special dinners, and social evenings are arranged. The terms at the Imperial Hotel are very moderate, and the Hostel is run by a committee of six *ex-officio* and two elected members, which include representatives of the British Medical Association, the Royal Society of Medicine, and the Fellowship of Medicine.

Many medical men from India visiting London will be glad to know of the Hostel. Full details with regard to it can be had on application to A. P. Bertwistle, Esq., F.R.C.S. Ed., 4, Spital Square, Bishopsgate, London, E.

The British Optical Convention, 1926.

A DELUSION which dies very hard with the medical profession is that British lenses and microscopes are

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inferior to those manufactured on the Continent. This is not the case; in fact Great Britain leads the world in the production of optical glass and lenses. At the British Optical Convention held in July 1926 at the Imperial College of Science, South Kensington, there were many interesting addresses, and many important exhibits. The Convention was opened by the Prime Minister, Mr. Stanley Baldwin, and the presidential address was delivered by Sir Frank Dyson, F.R.S., Astronomer Royal of Great Britain, whilst among the Vice-Presidents present were Sir Ernest Rutherford, Sir Oliver Lodge, Sir William Bragg, Sir Ronald Ross and Sir Richard Glazebrook. The Proceedings of the Convention, containing verbatim reports of the papers and discussions, have since been published at a cost of 30*s.* 6*d.* (including postage); and also an illustrated Catalogue of the Exhibition, which contains a full account of up-to-date British optical instruments, including cameras and photographic lenses, microscopes, spectroscopes, colorimeters, spectacles and optical instruments, etc., at a cost of 6*s.* 9*d.* (including postage). Both are available from Mr. Thomas Martin, Secretary to the Convention, 1, Lowther Gardens, Exhibition Road, London, S.W. 7; and many of our readers may be interested in these publications.

From the published account of the Proceedings we take the following items, which will be of interest to our readers:—

"The Astronomer Royal, in his presidential address reviewed the progress of optical manufacture in Britain and added some remarks on the contributions of astronomers to the art of optical design.

From about 1848 to the early 'eighties England occupied a dominating position in the manufacture of optical glass, but the challenge of Jena produced a temporary eclipse of such importance that in 1912 Britain imported 60 per cent. of her glass from Germany, 30 per cent. from France, and made only 10 per cent. at home. The outbreak of the war revolutionised this situation. The Institute of Chemistry initiated research upon glass manufacture so successfully that by 1917 the required formulæ had been found and, thanks mainly to the work of Sir Herbert Jackson, adequate supplies were made available for Britain and her allies. In 1918 nearly 9 tons of optical glass were being produced per month, and opticians can now obtain from British sources all the glass they require.

The war also led to great developments in range-finders, which find a use in peace-time for surveying and navigation; in lenses for aerial survey, and other instruments. British-made prismatic binoculars, which before the war were inferior to those from Germany, now hold their own with any in the world (and in particular offer a wider angle of view than any others).

The present progressive state of optical manufacture in Britain may be attributed to improved facilities for technical education, particularly at the Imperial College of Science; to the research and testing work carried on at the National Physical Laboratory, which supplies a constant stimulus to a high standard of achievement; to the Optical Society, which brings together manufacturers, theoretical opticians, astronomers and physicists; and to the British Scientific Instrument Research Association.

Turning to his own branch of science, the Astronomer Royal mentioned that a British worker, Gascoigne (who was killed in the Battle of Marston Moor in 1646), first invented the use of cross-wires in the telescope. The achromatic objective was due to another English scientist, Dollond, and the manufacture of these lenses became a British monopoly until it was killed by the glass tax. The removal of this tax in the middle of the 19th century led however, to a revival of the industry. Telescope objectives increased in size until a 40-inch glass was made in 1897; and a 41-inch objective, an entirely British product, is now being made for the Russian Government.

As regards reflecting telescopes, Sir Isaac Newton shewed how to grind mirrors for this purpose; Hadley introduced the parabolic figure; Herschel made enormous improvements in the general design of the instruments; and Dr. Common and Sir Howard Grubb developed the silvered glass mirror. The lenses employed for stellar photography in England, the United States, South Africa and Australia are of British manufacture; and an amateur astronomer, Franklin Adams, having commissioned an English optician to design a suitable lens, has photographed the whole sky in 206 exposures, shewing stars one million times as faint as those of the first magnitude.

The development of the spectroscope owes much to Huggins and Lockyer in England, while the echelon spectroscope is made only in this country."

The situation with regard to British optical glass is well-expressed in the following extract from a leading article in *The Times:* "That good optical glass is not made in this country is a delusion which dies hard. At one time there was some justification for the belief, but it was true of other countries as well. . . . . Before the war more than half the optical glass used in this country came from Germany, less than a third was supplied by France; and the small residue was made at home . . . . . By the end of the war, though our consumption had increased more than sixfold, practically the whole of our requirements were being supplied from home sources. The manufacturing resources thus established remain in existence, and the continuous improvement of the technical quality of the products is ensured by a research association organised under the auspices of the Department of Scientific and Industrial Research. But these resources and the fruits of research will alike go for nothing unless the public make up their minds to buy British-made glass and the instruments in which it is employed. That in doing so they will suffer no disadvantage in respect of quality . . . . . is attested beyond dispute by Mr. F. E. Smith, the Director of Scientific Research at the Admiralty, in the letter which we publish to-day. The British Navy is the largest user of high-grade optical glass and instruments in the world, and in its contracts the Admiralty now specifies, as it did not before the war, that its optical stores shall be throughout of British manufacture. The requirements of the Navy are of the most exacting character, and what is good enough for the ships of the fleet must be good enough for the ordinary user. It is hoped, therefore, that the myth of the inferiority of the British optical glass is finally exploded."

Recent Improvements in Microscopes.

"Recent British developments in the design and use of the microscope were fully illustrated, in the instruments and apparatus exhibited.

A microscope has three main elements: the illuminator; the object glass; and the stand which holds the optical parts and object in their proper relative positions. Each of these elements is important, and in all three very notable advances have been made. A series of apochromatic object glasses is now provided, which are superior to any made in any foreign country; many of those doing the most exacting microscopic work are discarding the foreign lenses in favour of these new ones.

The important British work on filter-passing micro-organisms—"filtrable viruses" as they are called—demanded an accuracy of focussing and a rigidity which was not provided by any existing stand, and such a stand has now been evolved in Great Britain.

The improvements in illuminating systems are, if anything, more important even than those in object glasses. A dark-ground illuminator has been developed which permits the use of higher powers than heretofore. Almost immediately this resulted in valuable new knowledge of the structure of the micro-organism associated with a prevalent disease. Other new illuminators for opaque objects, including one peculiarly valuable for metallurgical specimens, have increased the efficiency of the chemical and metallurgical applications of the microscope.

One may mention the entirely novel combined illuminator used in very important recent investigations, in

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which a high aperture dark-ground illuminator is mounted concentrically with and encircling a quartz condenser. The former secures visibility, and is used to locate the micro-organisms, while the latter is used with ultra-violet light to secure the image on the photographic plate.

This is, perhaps, a favourable opportunity for pointing out how essential to medical research is an efficient optical industry. Adequate instruments for investigations on filter-passing bacteria were a year or two ago not in existence. The British investigators in this line of work knew the limitations of their apparatus, and knew just what their requirements were. They laid their knowledge and requirements before the instrument-maker, and in a comparatively few months were supplied with the instruments that enabled them to go forward and to obtain, among other important results, those very striking ones relating to the cancer germ, which were so much noticed in the press a short time ago. Most of the instrumental essentials for that recent successful work are British, like the work itself.

The Ophthalmic Section at the Optical Convention.

Over 30 exhibits of an ophthalmic nature were included. They were visited by a considerable number of the 8,000 or more people who attended the Convention.

During the period which has elapsed since the last Convention in 1912 great strides have been made in the ophthalmic-optical industry, and these were clearly revealed. Firms established within the past few years showed products of undoubted excellence which have not only found a ready sale in this country, but have also found a demand in foreign countries.

Ophthalmic lenses of all types, including special forms of bifocals, trifocals and protective glasses; gold filled spectacle frames made by the latest mass production methods, some of which are the result of individual research; ophthalmic instruments, cases, books and sundries were exhibited. The varied nature of these products proved conclusively the healthy and vigorous nature of the industry. As a result of their participation in the Convention a number of firms reported satisfactory business; and the manufacturers were unanimous in expressing satisfaction with the results.

Meetings of the Convention revealed the large amount of research work which has been carried out by ophthalmic opticians during the past few years. Two lectures especially, by Messrs. Owen Aves and W. Swaine respectively, dealt exclusively with statistical research, and they advanced many new and valuable points. Other lectures dealt with such varied subjects as visual accommodation and facial asymmetry. Professor G. Elliott Smith delivered a highly impressive address on the eye and its functions. The international reputation of this lecturer was upheld by his lecture, which was attended by a numerous company.

Although for many years high-grade optical glass had been manufactured in Great Britain, it was not until 1919 that the manufacture on a large scale of ophthalmic lenses was set on foot. The success which has attended this undertaking during the few short years of its history was amply demonstrated.

In the design of ophthalmic lenses remarkable advances have been made. To a wide range of invisible fused bi-focal (two-sight) spectacle lenses have been added tri-focal (three-sight) lenses, which involve complicated processes. Research work, which has been patiently and persistently carried on by experts in this highly specialised branch of work, has resulted in the production of unique lenses which eliminate many of the defects hitherto attaching to ordinary lenses. The practical elimination of chromatism (colour) from two-sight lenses, and the lessening by a considerable amount of the distortion produced by the older forms of lenses are two of the remarkable achievements which stand to the credit of this undertaking.

In one factory alone 25,000 square feet of floor space is filled with specially designed machinery working at full pressure supplying the growing demand for high-grade ophthalmic and precision lenses. Here is an instance where mass production has been reconciled with first-class work and unfailing accuracy."

The Office International d'Hygiene Publique.

AT the October 1925 session of the Office International d'Hygiene Publique in Paris representatives from thirty-three countries were present, the representative for India being Colonel J. B. Smith, I.M.S., (retd.). One of the most important matters dealt with was the question of an international code of nomenclature of causes of death; such a code was published in 1924 but has so far been adopted only by Great Britain and the United States.

With regard to different diseases it was recognised that deltaic Bengal is still the chief focus for cholera in the world. The Government of India reported that most vigorous steps were being taken,—at first on an experimental scale. In a selected area anti-cholera vaccination is being tried on an extensive scale under the auspices of the Indian Research Fund Association in order to study the results. Steps are also being taken to vaccinate the pilgrims to the Hedjaz. With regard to plague, reports were received from several countries—including India—on the distribution of the rodent fauna in these countries and the species of fleas prevalent on them. Australia, South Africa, Greece and Italy are taking special measures against the importation of infection.

A project for a co-ordinated enquiry into the pathology and prophylaxis of small-pox was discussed and several reports on small-pox, vaccinia, and alastrim, received from Great Britain, India, and Belgium will be published. A study of the incidence of tabes and of general paralysis of the insane in England has shewn that of 100,000 individuals with syphilis treated by the novarsenobillon derivatives only 10 developed these diseases, and it would appear that the introduction of the arsenical compounds in the treatment of syphilis is leading to a marked diminution in the incidence of tabes and of general paralysis. Further investigations on this matter are called for, however, since such factors as race, habits of life, and climate may affect the incidence. With regard to scarlet fever there has been a special study of the bacteriological aspects of the disease: Gabritchevsky's vaccine, the value of the Dick test, and the use of the sera of convalescents has been studied. Terminal disinfection in this, as in other, diseases is a most important prophylactic measure.

A special report was received on the new 1925 legislation in Great Britain on therapeutic substances. The regulations in different countries with regard to biological products and the arsenobenzene derivatives vary; some countries insist on an official testing of all batches produced, others leave the responsibility of testing to the chemical firms concerned. The Committee decided to carry out a comparative study of the legislation concerning this subject in different countries and to make a special report for study.

Other matters discussed were the international opium situation, the diseases of the Mediterranean basin, spirochætal and other forms of epidemic jaundice, the role of railways in disseminating disease, scurvy, the public health organisation in Egypt, and the results of the campaign against syphilis in Algiers.

The Physique of Indian Races.

AN interesting set of tables of heights, weights, etc., of Indian assured lives has recently been published by the Oriental Government Security Life Assurance Co., Ltd., Oriental Buildings, P. O. Box No. 148, Bombay. The tables are based on measurements of 3,439 Hindus living in Bengal, 18,006 Hindus in Bombay, 12,077 Hindus in Madras, 4,011 Hindus in the Punjab and Sind, 4,263 Hindus in the United and Central Provinces, 2,374 Mahommedans, 2,367 Parsis, and 4,649 Indian Christians. The conclusions drawn from a study of the tables are as follows:—

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"The arrangement of the tables in the pamphlet is from the lightest average physique to the heaviest average physique, the lightest being the average physique of the Hindu of Bombay, Deccan and Gujerat, and the heaviest being that of the Hindu of the Punjab, Delhi Province and Sind.

From a comparison of the tables it is seen that the Hindu of the Punjab has the best all-round physique and comes nearest the European standard, followed by the Mahommedan, the Hindu of Bengal and the Parsi. The Hindu of the Central and the United Provinces is heavier than the Parsi at the lower ages, but at ages over 35 the latter becomes heavier than the Hindu and gradually draws away until a very marked difference in weight is observed at the higher ages.

There is little difference between the Hindu of the Central and of the United Provinces and the Hindu of Bengal, but it is observed that at ages above 35 the Hindu of the Central and of the United Provinces is of a remarkably good build, if short in stature, but he does not maintain anything like the same standard at the higher statures, while the Hindu of Bengal is rather inclined to obesity at the higher ages.

The tables for these classes were however based on a considerably smaller number of lives than were the tables for the Hindu of Southern India and Western India, but nevertheless it is believed that they reflect accurately the average physique of the class of people in the territories referred to.

The tables of chest measurements disclose the fine physique of the Parsi and the Hindu of the Punjab as compared with that of the other classes, the chest measurements of these classes showing a greater increase in relation to height than in the case of any other of the classes investigated. In these tables of chest measurements the Hindu of Madras shows up the worst of all the groupings investigated.

With regard to chest expansion, for men up to 5 ft. 7 in. in height the average chest expansion may be taken to be 2 in. for all ages and in the case of men of greater height the average expansion varies from 2¼ in. to 2½ in. The Parsi and the Hindu of the Punjab show the best chest expansion.

A comparison of the average abdominal measurements shows what was to be expected, that the difference between the average abdomen and the average chest slowly narrows down with the increase in age. At the older ages the abdominal measurement is almost the same as the chest measurement, but in the case of the Hindu of the Punjab the abdominal measurement tends to exceed the chest measurement at the higher ages."

The following table shows the average height of the individuals included in the various groupings as compared with the average height of Scotsmen, Irishmen, Englishmen and Welshmen.

	Ft.	In.
Scotsman	5	8¾
Irishman	5	8
Englishman	5	7¼
Welshman	5	6½
Punjab Hindu	5	6
Indian Christian	5	6
Parsi	5	5⅔
Mahommedan	5	5⅔
Bengal Hindu	5	5½
C. P. and U. P. Hindu	5	5⅓
Madras Hindu	5	5
Bombay Hindu	5	4

Statistical Studies on Heart Diseases.

AN interesting report on the statistical classification of cases of heart disease is one published by Dr. A. E. Cohn of the Hospital of the Rockefeller Institute for Medical Research, New York, and Dr. J. Wyckoff and C. Lingg in the *American Heart Journal* for 1926, (Vol. I, No. 4). The authors studied one thousand cases of heart disease admitted either as private ward patients or general in-patients, or studied as outside private cases of different races in the United States. Their conclusions are perhaps hardly applicable to Indian conditions, but it would be of considerable interest to compare their conclusions with a similar study carried out in the tropics. The author's summary of their findings is as follows:—

"In the foregoing analysis of 1001 cases of organic heart disease among adults, we found that:

1. There was a close resemblance among the histograms representing the three prominent types of heart disease for the clinic patient, private patient, and ward patient groups.

2. About one-fourth of the cases presented rheumatic heart disease, about two-fifths arteriosclerotic, about one-tenth syphilitic, and about one-tenth heart disease of unknown origin; other factors, such as scarlet fever, hyperthyroidism, nephritis, etc., together, comprised less than one-tenth of the total sample.

3. A comparison with the mortality curve led to the belief that the private and ward groups were more representative of organic heart disease, so far as age and etiology are concerned.

4. Rheumatic heart disease was rare after fifty years of age; from 90 to 95 per cent. of the cases of rheumatic heart disease occurred before the age of fifty years, more than half of which occurred before the age of thirty. About 50 per cent. of the syphilitic cases occurred before the age of fifty, and 50 per cent. after this age; the disease appeared to be rare before the age of forty and after the age of sixty. From 80 to 95 per cent. of the cases of arteriosclerotic heart disease occurred after fifty years of age. Two-thirds of the cases of unknown etiology presented lesions typical of rheumatic heart disease, and occurred before the age of fifty.

5. In about three-fourths of the cases of rheumatic heart disease rheumatic fever, either alone or in combination with other infections, was an etiological factor; tonsillitis, in one-fourth of the cases; chorea, in a little more than one-tenth of the cases, and growing or joint pains, in about one-twentieth of the cases. With the exception of chorea, which occurred twice as often among females as males, the relative frequencies of these infections was about equal for the sexes.

6. Rheumatic heart disease seemed to be as common among males as among females. In syphilitic heart disease the ratio of males to females was about seven or eight to one; arteriosclerotic heart disease appeared to be much more common among males than among females. The reason for this is inexplicable since the mortality from heart disease is about equal for the sexes in the higher age groups.

7. Foreign-born whites made up almost half of the total sample. Little could be learned about the predominance of race or nationality in any of the types of heart disease, both on account of the small number of cases, and because of the fact that age and etiology seem to be so closely related, and that the older immigrants, the Irish and the Germans, constitute the older age groups, and the newer immigrants, the Italians and the Hebrews, the younger age groups. With these points in mind, the rather large proportion of Irish found in the rheumatic group, the rather large proportion of Irish and colored, and the small proportion of Hebrews in the syphilitic group, and the relatively large proportion of Hebrews in the arteriosclerotic group suggest that a detailed study, comprising a larger number of cases, along this line is desirable.

While it must be strongly emphasized that no conclusive deductions can be drawn from the foregoing analysis on account of the small number of cases, this study should, nevertheless, focus attention upon the following points:

1. The available mortality statistics for organic heart disease are inadequate in any attempt to study the age incidence and duration of the disease, because they are based on deaths recorded in accordance with the International List of Causes of Death which is not so classified as to make it possible to distinguish between the infectious and degenerative varieties of the disease.

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A NOTE OF WARNING!

DOUBT having been expressed by a medical practitioner in a recent issue of the *B.M.J.* as to the efficiency of Dimol when taken in the form of pulverettes, we desire once more to call attention to the fact that, where there is a deficiency of pancreatic enzyme, all keratin-coated tablets or pulverettes are liable to pass undissolved throughout the intestinal tract.

For this reason, and at the suggestion of various correspondents, sugar-coated B Dimol pulverettes (yellow) have been prepared and are found to give most gratifying results. They are partially dissolved in their passage through the stomach, but the action of Dimol is not impaired thereby, and is free to exert its powerful influence immediately after its passage through the pylorus; whereas the keratin-coated A Dimol pulverettes (white), even under the most favourable conditions cannot be expected to get to work so quickly, and may even, as above explained, pass undissolved.

Each pulverette contains 1 gr. pure Dimol, and Dimol is guaranteed by the Rideal-Walker test to be 35 times more efficient as a bactericide than carbolic acid; that is to say, in administering 3 Dimol Pulverettes, the patient is receiving the bactericidal equivalent of 105 grains of carbolic acid. Moreover, it is not absorbed, being voided with the fæces after doing its work.

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2. By introducing into clinics a uniform system of records and organizing clinics in such a way as to facilitate the collection of facts for statistical purposes, reliable and important data concerning heart disease may be made available.

3. It is only when heart disease is treated in special cardiac clinics or wards or by physicians who are specialists in heart disease, and when these agree upon uniform methods of seeking, describing, and recording the facts as they present themselves in individual cardiac cases, that sufficient data can be collected and any progress be made in understanding the problems with which this study deals."

Reviews.

MOSQUITO REDUCTION AND MALARIAL PREVENTION.—By J. A. Crawford, M.B., Ch.B. (Edin.), Capt., R.A.M.C., and B. S. Chalam, L.R.C.P. & S. (Edin.), L.R.F.P. & S. (Glas.). Calcutta: Oxford University Press, 1926. Pp. 102. Price, Rs. 3.

THIS little handbook is designed, the authors say, to quicken the interest of the tea garden manager, the malarial inspector and the N. C. O. in charge of a sanitary squad in mosquito reduction and malaria prevention, and it must be reviewed in the light of that intention, or rather, let us say more generally, as a work composed for the intelligent layman.

There is certainly much in it that such a reader will find of much interest and pleasure, the latter due largely to its concise composition and first-rate production by the publishers. The principles involved are clearly stated, and the general classification and description of the mosquito life-cycle as well written as anything one could find anywhere.

At the same time though the book is written for the layman we think that "scientific" accuracy should not have been sacrificed in any particular. It may be true from a "practical" point of view that there are but 9 abdominal segments in the mosquito, but morphologically there are 10. Perhaps the best thing would have been to say "there are 8 visible segments." There are other similar inaccuracies in the book.

There are yet others which are of practical importance, e.g., on page 35 *A. listoni* is stated to have 6 pale fringe spots. Surely if the layman is to learn his mosquitos he should be told accurately how to do so. Similarly there should be no important omissions in their schedule. The book is addressed to tea planters, and yet no mention is made of *A. umbrosus* and *A. aconitus*, two species out of the 6 which particularly affect them, as Strickland has reported in the *Indian Medical Gazette*, Vol. LX.

In the section on the habits of mosquitos there are on pp. 47 and 50 some statements which may turn out to be true, but for which there is at present no evidence but surmise.

A handbook of this nature is certainly wanted nowadays for the purposes announced by the authors, viz., to stimulate the interest of the layman or unqualified man in antimalarial work.

MIND AND ITS DISORDERS.—By W. H. B. Stoddart, M.D., F.R.C.P. Fifth Edition. London: H. K. Lewis & Co., Ltd., 1926. Illustrations 87 including 6 coloured plates. Demy 8vo. Pp. xx plus 593. Price, 21s. net.

THE psychiatrical world, certainly the English-reading portion of it, will welcome the latest edition of what is becoming rightly one of the "classics" on mental disorders. Dr. Stoddart is to be congratulated not only on his book reaching its fifth edition, but on its containing to maintain its high standard of excellence. The whole work has been thoroughly revised and the following are the principal changes consequent upon such revision. The critical digest on intrathecal medication which the author included in the fourth edition under the heading of treatment of general paralysis, has given place to descriptions of two more recent and more successful methods of treatment, viz, the tryparsamide and malarial. Another change is the addition of a short—too short, some will consider—chapter on encephalitis lethargica. The chapter on the insane and the law—always melancholy reading—has been revised by Mr. W. H. Gattie, K.C. For the increase in the reliability of the index the reader will wish to follow the author's example and tender his thanks to Mrs. Stoddart.

DISEASES OF THE NEW-BORN.—By J. A. Foote, M.D. London: J. B. Lippincott Co. Illustrated. Pp. 231. Price, 21s. net. Obtainable from Butterworth & Co. (India), Ltd., P. O. Box 251, Calcutta. Price, Rs. 15-12 net.

THIS little book of 231 pages consists of a series of monographs from the pens of some seven professors of the faculty of medicine of Georgetown University. The whole are collected together by Professor J. A. Foote, the Professor of Pediatrics and diseases of children in the University of Georgetown, who has written the majority of the papers himself.

The first part of the book deals with the care of the newly-born child; describes the injuries and accidents which may occur to it during birth; and the proper treatment of such injuries. There is a special chapter devoted to intracranial hæmorrhage, and the author has given us an excellent description of the signs and symptoms of this serious accident. He asserts dogmatically that the best treatment of this condition is rest, quiet, the avoidance of all but the most essential movements and external stimulus. In this we are wholeheartedly in agreement with him.

Later on there is a description of the skin diseases of the newly-born, which is illustrated with some excellent photographs, and there is also a well written chapter on the problems of breast and artificial feeding.

The latter part of the book deals with statistics of infant mortality, and descriptions of such therapeutic measures as circumcision; how to irrigate the conjunctival sac; how to pass a catheter, etc., which appear to us to be somewhat unnecessary in a volume of this nature.

Though this little book contains practically nothing that is new, it is well written and compiled, and illustrated, and will undoubtedly be of use to the busy general practitioner who does not wish to go to the expense of a large text-book on the subject of pediatrics.

H. E. M.

AIDS TO PATHOLOGY.—By Dr. Harry Campbell, M.D., B.S. (Lond.), F.R.C.P. Fifth Edition. London: Bailliere, Tindall and Cox, 1926. Pp. viii plus 250. Price, 4s. 6d. net.

THIS little book will be especially welcome to medical students and to those reading for examinations. The new edition has been almost entirely re-written and contains much new matter, especially in the sections on the vitamines, endocrines, the spleen, diabetes, tumours, and immunity. The publishers are to be congratulated in having secured so well known a teacher as Dr. Harry Campbell as author of this volume of the "Aid Series." By the use of sections in small print an immense amount of information is included in the book. We can cordially recommend it to students, and to practitioners who wish to revive their knowledge of pathology.

AIDS TO CASE-TAKING.—By H. L. McKisack, M.D., F.R.C.P. (Lond.). Second Edition. London: Bailliere, Tindall and Cox. Pp. vii plus 168. Price, 4s. 6d. net.

"THE object of this little book" writes the author, "is to assist practitioners and students to examine their cases in a methodical manner. The ordinary syllabus

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of case-taking is amplified into a short manual, which is not restricted to a description of the methods to be adopted in examining the patient, but also indicates as concisely as possible the diagnostic value of the morbid conditions observed. Only those methods of examination are fully described which may be carried out in the practitioner's study, or in the ward or clinical room of the hospital."

In these objects the author has succeeded admirably, and this little book will be of value not only to the medical student, but also to the medical practitioner. Systematic case-taking is the very basis of modern medicine, and is a subject in which medical students in India should receive special training, since so often they tend rather to memorise from text-books than to learn real clinical medicine. The sections on examination of the blood and urine are good, and recent simple biochemical tests are described. The new edition has been largely re-written.

BAILLIERE'S NURSES' COMPLETE MEDICAL DICTIONARY.—By H. Clifford Barclay, M.D., F.R.C.S.E. Third Edition. London: Bailliere, Tindall and Cox, 1926. Pp. viii plus 248. Price, 3s. 6d. net.

THIS is a most handy little book and admirably covers the ground intended. It will be very useful not only to nurses but also to medical students and to junior medical practitioners. The indexed matter is full and is dealt with in simple terms. Appendices at the end deal with abbreviations used in prescription writing, initials used for degrees and diplomas, weights and measures, and the symptoms and treatment of cases of poisoning. Altogether an admirable little book, and one which would be very useful to readers in India.

"DAMPATI": A BENGALI BOOK ON MARRIED COUPLE.—By Dr. Sisir Kumar Sen, B.A., L.M.S. To be had from 75-1, Beadon Street, Calcutta. Pp. 143. Price, Rs. 2-8.

THE author has very carefully dealt with the subject of sexual science in dignified language. His intention is to elevate the morals of his readers and to instruct them how to be happy and healthy. There are very few Bengali books dealing with eugenic development and the author is to be congratulated for ably bringing this out. The book is to be recommended to all Bengali married couples.

CORRIGENDUM.

At the end of the review on p. 631 of our issue for December 1926, for the initials W. L. H. please substitute the initials H. G. A. Dr. Lilienthal's *Thoracic Surgery. The Surgical Treatment of Thoracic Disease* was sent to Lieut.-Col. W. L. Harnett, F.R.C.S., I.M.S., for review, but was subsequently made over to Major Alexander, I.M.S., for review; whence the mistake, which is much regretted.—ASSIST. EDIT., *I. M. G.*

Annual Reports.

ANNUAL PUBLIC HEALTH REPORT OF THE PROVINCE OF ASSAM FOR THE YEAR 1925. BY MAJOR T. D. MURISON, D.P.H., I.M.S., DIRECTOR OF PUBLIC HEALTH, ASSAM. SHILLONG: ASSAM GOVERNMENT PRESS, 1926. PRICE 12 ANNAS OR 1*s.* 6*d.*

Food Prices.—The price of common rice was slightly higher than during the previous year; 9 seers to the rupee was the average price.

Birth and Death Rate in the Plains.—The former showed a decrease during the year, but it was higher than during the last quinquennial period. Compared with the birth-rates in other provinces in India, it is distinctly low, only Burma and the North West Frontier Province having a lower rate. The death rate has decreased markedly; it was only 22.52 per thousand, against 27.3 and 29.3, respectively last year and during the last quinquennial period. The lowering of the death rate was noticeable throughout the province. This was partly due to the better meteorological conditions and probably partly to the extensive kala-azar treatment campaign. Over 60,000 cases were treated; if these had not been treated a 90 per cent. death-rate amongst these might have been recorded. The deaths registered during the year numbered 187,127; an addition of over 50,000 to this figure would have increased the death rate up to that of the last quinquennial period.

In the Khasia and Jaintia Hills there was no epidemic of note and the birth and death rate underwent little change. In the Naga Hills registration is confined to a small area; as in the previous year, the death rate exceeded the birth rate. General health in the Lushai Hills was better this year. The registration in the Garo Hills district was extended to the hill portion of the district during the year. The birth-rate exceeded the death-rate in this district. The main causes of death were kala-azar and malaria.

There was practically no influenza during the year.

Deaths from cholera were returned as 0.9 per mille; this was considerably less than the decennial average. The district of Nowgong suffered most from cholera during the year. The disease broke out twice in epidemic form in Nowgong and affected almost the whole of the district, especially the areas adjacent to the banks of the Kallang river and also an area in the north-west of the district. The first outbreak occurred in June and July and the second one from October to December. Both epidemic units, consisting of 6 sub-assistant surgeons and 13 disinfection carriers, were employed under the supervision of the Assistant Director of Public Health, Assam. The special feature of the preventive measures undertaken was the inoculation of all contacts with cholera vaccine. This had a marvellous effect in arresting the disease. All sources of water supply were disinfected with bleaching powder and potassium permanganate. Certain streams from which the people of the infected villages drew their water supplies were infected and this rendered preventive measures very difficult. Under these circumstances inoculation proved to be the mainstay and was of the greatest value.

The epidemics in Darrang, Kamrup and Sylhet which were not so virulent responded to inoculation and disinfection of water supplies.

A total of 1,03,930 c.c. of cholera vaccine was issued during the year, of which 22,310 c.c. was supplied to local and municipal boards. The initial information as regards outbreaks of cholera now reaches the department much earlier, and consequently it is now possible to undertake preventive measures much more promptly. The rules regulating the system of reporting epidemics are now under revision in order to make them more effective.

During the year two epidemic units, each consisting of three sub-assistant surgeons and six disinfection carriers, were sanctioned for dealing with epidemics. They were of the greatest value in fighting epidemics, especially cholera. Two units have proved to be quite inadequate, and proposals for increasing their number are under consideration.

Red Cross pamphlets on cholera, dealing with the method of the spread of infection and how best it can be avoided were obtained and distributed. Magic lantern demonstrations with suitable slides were also given by the assistant surgeons on *kala-azar* duty. These pamphlets are also being read in primary schools, where they will have a far-reaching effect.

Amongst towns, Goalpara (2.09), Nowgong (1.59) and Karimganj (1.09) recorded high death-rates from cholera. None of them has a controlled water supply and it is probable that infection from the neighbouring rural areas was introduced into them.

Small-pox.—The death rate from small-pox was 0.4 per mille. This is almost the same as the decennial

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In April, 1925, there were at the "Institut de Serotherapie Hemopoietique of Romainville, Paris," 800 horses used for the production of serum.

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average. The highest mortality rates in urban areas were 3.83 and 2.28 in Golaghat and Nazira, respectively. There is no segregation hospital in either of these districts and notification is not enforced.

Fevers.—The death rate from fevers showed a decrease from 16.7 per mille of the decennial average to 14.3 for 1925. During the year certain anti-malarial measures were carried out.

At Lumding operations were carried out on the same lines as in previous years. The general condition of some of the important breeding places was improved. The river Haru-Langfer is reported to be the only really serious breeding ground of carrier anopheline species, as *A. listoni* and *A. culicifacies* were found there on several occasions. All breeding places were treated with a mixture of crude oil and castor oil. Cinchona was used with good results. One thousand six hundred and eighty cases of malaria were treated during the year as compared with 2,419 in 1924.

At Haflong a gang of men is employed to remove all undergrowth on edges of drains and sprinkle kerosine oil where there is any collection of water. Their duty is also to cut down all rank vegetation within the station. The edges of lakes were kept free from overhanging grasses and weeds and covered with a film of kerosine oil, to prevent mosquitoes breeding there. The district Civil Surgeon supervises the work of the staff once a month.

The Doom-Dooma Tea Company in Lakhimpur district carried out with good results an anti-malarial work in their gardens under skilled supervision. Other estates in that district are also considering the question of initiating anti-malarial schemes.

During the year anti-malarial measures comprising the following items of work at a cost of Rs. 4,050 were carried out in Kohima town:—(1) cutting of all jungle in the station within a certain radius; (2) daily oiling of all streams; (3) opening up of all sluggish water channels; and (4) bunding up of all seepage collections of water and oiling of the surfaces so obtained. The scheme was commenced on the 15th April, 1925. A staff of 2 sardars and 30 local coolies was engaged and housed in three huts so as to be near the scene of their work. The station was in the course of seven months completely cleared from within ¾ mile of its western cart road and to the foot of the eminence of Kohima Naga village hill. It is at this end of the station that the jungle clearing could not be thorough on account of the vested rights of the Nagas of Kohima village whose land is contiguous and had to be left untouched, though two platoons of the Assam Rifles located here suffered more than the other ranks of the battalion from malaria, viz., Platoons 9 and 10. Cutting down of as much scrub as was permitted in that direction with other prophylactic measures taken undoubtedly helped in controlling the disease. With the exception of the barracks of Platoons 9 and 10, where specimens of *A. maculipennis* were found, most of the flying insects caught were either *Culex* or other gnats. Collections of larvæ from rice fields and pools were hatched out but all proved to be of the culicine variety. During the year only one of the European officers of the Assam Rifles suffered from malaria of benign tertian type. His residence is situated low down on an easterly spur that overhangs a low valley. Special attention was paid to the clearing of the jungle in its vicinity and the officer escaped further attacks of fever.

Kala-azar.—The number of deaths from kala-azar recorded during the year was 6,365 as compared with 5,585 in the preceding year. The recorded deaths from kala-azar in the districts of Sylhet, Goalpara, and Garo Hills were higher than those of the preceding year. The heavy increase from 69 to 535 deaths in the Garo Hills is due to the extension of the registration to the hill *mauzas* during this year, indicating that the disease is more prevalent in the hills than in the plains part of this district. The number of kala-azar patients treated during the year rose from 48,770 in 1924 to 60,940 in 1925. The percentage of deaths to the total treated was 10.44. If the 60,940 patients had remained untreated, 90 per cent. of them or 54,846 persons would have died and inflated the death rate. The provincial organisation for the treatment of kala-azar remained almost the same as in the previous year. As in the previous year, 6 special assistant surgeons and 110 sub-assistant surgeons, the number of the latter being raised from 81 in 1924, were on kala-azar duty, and as usual all sub-assistant surgeons—whether in charge of special kala-azar dispensaries, State or Local Board dispensaries—visited and re-visited villages within a radius of 5 miles of their dispensaries in search of fresh cases, and all cases detected were brought under treatment.

The number of "stopped treatment" cases is showing a tendency to decline, partly on account of the reduction in the length of the course of treatment resulting from the introduction of urea-stibamine, and to magic lantern demonstrations in which the danger or stopping treatment before complete cure is effected is fully explained. 'Stopped treatment" cases are still very high. A partially treated kala-azar patient continues to be infectious to others and it is the duty of all educated people to induce such patients to undergo a complete course of treatment for the good of the community. A pamphlet written in simple language and in a conversational style in which it is laid down that treatment should be continued until cure is effected is being read in primary schools and is being distributed to the general public. Publicity in this manner should show good results. Since the close of the year a pictorial poster displaying the figures of a patient before and after treatment has been printed and is being exhibited in all public places.

As in previous years all sub-assistant surgeons surveyed kala-azar infected villages within a radius of 5 miles of their respective dispensaries, and for the areas not so covered special sub-assistant surgeons were placed on survey duty. As previously the treatment of outdoor patients was carried out by means of sodium antimony tartrate supplied by Burroughs, Wellcome & Co. Since August 1925 in all special kala-azar hospitals and hospitals at the district and sub-divisional headquarters, all kala-azar patients are being treated with an organic compound of antimony called urea-stibamine. The use of urea-stibamine was further extended later in the year to 10 per cent. of outdoor patients attending at the indoor hospitals. The greatest advantage of urea-stibamine over sodium antimony tartrate is that it shortens the course of treatment from about three months to about one month. The price of the former drug is at present too high to allow of its employment generally. Further extension of the use of this drug in so far as this is possible with the money available is under consideration. All assistant surgeons and sub-assistant surgeons ordered to administer urea-stibamine were trained in the technique of administration of the drug at the Pasteur Institute, Shillong.

In the Cachar district no newly infected villages were discovered during the year. The Moibang indoor hospital for kala-azar patients worked satisfactorily. In Sylhet 4 paying wards have been added to the kala-azar hospital at Habiganj, raising the total indoor accommodation to 34 beds. A special ward of 12 beds has been provided in the Sadar Hospital. The hospital at Shatiajuri was closed. There are in the Sylhet district 38 special kala-azar dispensaries with 61 sub-centres, in addition to the usual Local Board dispensaries and 3 dispensaries with 6 sub-centres run by the Kala-azar Relief Association.

In the Goalpara district three new centres for treatment were opened and one was closed. Two Forest Department dispensaries have been equipped for the purpose of treating kala-azar patients during the year. On survey, Khetri *mauza* in the Kamrup district was found to be heavily infected. A survey of the Borpeta sub-division shows that the infection in it is milder than in the Gauhati sub-division. New foci of infection in Tapachamti village in Barkhetri *mauza*, Bidhia in Korua *mauza* and Kamarkuchi village in Upper Shorbhog *mauza* have been detected, and arrangements for treatment in these areas have been made. In Darrang there

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is one kala-azar ward at Tezpur and seven outdoor dispensaries for treatment of kala-azar patients. In the Nowgong district proposals for the establishment of three new treatment centres have been sanctioned during the year. The railway hospital at Lumding continued to treat both railway employees and outsiders. A survey of the whole of the Sibsagar district with the exception of the Mikir Hills was carried out during the year and 75 villages in the Sibsagar sub-division, 56 in the Jorhat sub-division and 117 in the Golaghat sub-division have been found to be lightly infected. The Mikir Hills will be surveyed as soon as a Naga or a Khasi sub-assistant surgeon is available for the work. In the Lakhimpur district a sub-assistant surgeon has been surveying the villages in the North Lakhimpur sub-division. A total of 69 fresh cases were brought under treatment in the Lakhimpur district. All cases appear to be sporadic and no heavy infection has been discovered in any part of this district. In the Garo Hills a proposal to extend the hospital at Tura is under consideration. Owing to the scarcity of Garo sub-assistant surgeons, outdoor treatment in this district gives no promise of success and the only alternative is to enlarge the indoor hospital at Tura and insist on cases from the district being brought into Tura for treatment. It is hoped that the shorter treatment with urea-stibamine will attract Garos to the hospital.

In the Sadiya Frontier Tract, of the nine patients treated, eight were imported from other districts and one who is a native of the district was infected in the Nowgong district. In the Naga Hills district four cases were detected in Dimapur and all of them have been brought under treatment.

The kala-azar section of the report is concluded with the statement, "the very valuable and most interesting researches of the Kala-azar Commission have brought to light the fact that the sandfly (*P. argentipes*) plays an important part in the propagation of kala-azar." (This statement is a somewhat premature one as, up to the present, it has not beeen fully proved that the sandfly, *Phlebotomus argentipes*, is connected with the propagation of kala-azar. Further, it was not the work of the Kala-azar Commission that first brought this sandfly under suspicion.)

Major T. D. Murison, I.M.S., held the post of the Director of Public Health, Assam, during the year; he was however absent on leave from April 5th until December 4th; during this period Major J. B. Hanafin, C.I.E., I.M.S., officiated.

L. E. N.

ANNUAL REPORT OF THE DIRECTOR OF PUBLIC HEALTH, MADRAS, FOR THE YEAR 1925. BY MAJOR A. J. H. RUSSELL, C.B.E., M.A., M.D., D.P.H., I.M.S., DIRECTOR OF PUBLIC HEALTH, MADRAS. MADRAS: SUPERINTENDENT, GOVT. PRINTING. PRICE RE. 1-2-0.

THE year under review must be regarded as almost as unhealthy as the year 1924, owing to the continued high mortality from cholera. The total number of deaths (1,000,558) from all causes, though slightly less than in 1924 (1,006,043), was still much higher than the average for the quinquennium (920,312). Details in regard to the more important diseases are given below.

Cholera.—The disease was practically confined to the southern and south-western districts of the Presidency and was severe in the districts of Madura, Tanjore, Rāmnād, Tinnevelly and South Arcot. Of the northern districts, Anantapur and Gōdāvari East were entirely free from the disease, while in none of the other districts did the mortality exceed 120. The total number of deaths was 44,815 against 51,971 in 1924 and represents a death-rate of 1.1 per mille as compared with 1.3 in 1924 and 0.7 the quinquennial average. The epidemic which prevailed in the cold weather of 1924 continued into 1925 and caused nearly 18,000 deaths during the first quarter of that year. During the second and third quarters, the disease was chiefly confined to those areas where there was an extreme scarcity of water owing to the failure of both the monsoons in 1924 and of the south-west monsoon in 1925. With the advent of the north-east monsoon, cholera rapidly subsided in the non-deltaic dry tracts and broke out in severe form in the deltaic tracts of the southern districts.

The statistical investigations carried out by the Director of Public Health have disclosed the fact that cholera epidemics tend to be most virulent every seventh year and as the disease was at its worst in 1918 when nearly 123,000 deaths were reported, it was anticipated that the incidence of cholera would again be high during 1925. The knowledge resulting from the Director's investigations, however, enabled the public health staff in the districts to be on the alert and to adopt preventive measures in advance, with the result that the of 1925 resulted in considerably fewer deaths than that of 1918.

Since the introduction of the districts health scheme outbreaks of the disease in pilgrim or fair centres have been the exception.

Prophylactic inoculation was carried out on an extensive scale in the Coimbatore and Salem districts. Out of 4,448 persons inoculated only one contracted the disease.

The Government trust that with the aid of grants sanctioned by them for the improvement of the water-supply in rural areas, local bodies will be able to provide a pure water-supply in festival and fair centres, and in villages lying on the main routes leading to them.

Small-pox.—The mortality rose from 18,810 to 20,478. The death-rate was 0.5 per mille of the population against 0.4 in 1924, and a corresponding quinquennial rate. More than half of the total mortality occurred in seven districts (South Arcot, Gōdāvari East, Salem, North Arcot, Guntur, Gōdāvari West and Anantapur). Fifty-six municipalities registered 2,442 deaths from this disease compared with 1,456 in 67 towns in 1924. The largest number of deaths was recorded in Rajahmundry (437), Vizagapatam (205) and Palacole (171). About 74 per cent. of the total mortality occurred among children under ten years of age, showing that the child population of the Presidency is still inadequately protected and that a still more vigorous policy is called for on the part of the local bodies in conducting both primary vaccinations and re-vaccinations. It is reported that in many districts the local bodies do not maintain either an adequate or efficient vaccination staff.

The Government have already commended to local bodies for their adoption a revised scale of pay recommended by the Director for vaccinators and are considering the question of ensuring the employment by local bodies of a qualified and efficient staff. Collectors of districts have been requested to issue instructions to village officers to give immediate information to the health staff of outbreaks of the disease as the spread of infection can only be checked if the first attacks are promptly reported.

Plague.—The number of deaths from plague (2,014) was the lowest on record, since the disease first made its appearance in the Presidency, and represents a death-rate of 0.1 per 1,000, as compared with an equal rate in 1924, and 0.3 the quinquennial average. Nearly 93 per cent. of the total mortality was reported from the districts of Salem (898), Coimbatore (392), Madura (207), Bellary (205), and Rāmnād (176). The municipalities most affected were Salem (699), Pollāchi (141), Calicut (54), Madura (36), Mangalore (33), Periyakulam (22) and Dhārāpuram (21). The benefit of inoculation was amply demonstrated by the fact that in a village in Bellary district where plague broke out, 61 attacks and 15 deaths occurred among 269 uninoculated persons as compared with only 15 attacks and no death among 1,531 inoculated persons.

Malaria.—The incidence from this disease is difficult to ascertain owing to defective registration. The disease was prevalent in almost all the districts of the Presidency and severe epidemics are reported to have occurred in the districts of Anantapur, Bellary and Salem. The rate of incidence in Madras City also increased. The local bodies however do not appear to have taken any

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measures to eradicate the disease from the areas under their jurisdiction. The Government trust that they will realize the importance of taking action in this direction and of distributing quinine free of cost to those residing in malarial tracts through the medical officers in-charge of the regular and village dispensaries or other agency. The question of undertaking the free distribution of quinine in *specially* malarial tracts at the cost of Provincial funds is engaging the attention of the Government.

Relapsing Fever was prevalent in a mild form in the districts of Coimbatore, the Nilgiris, South Arcot, Trichinopoly and Kurnool. The special campaign against the disease in the Nilgiris was continued during the year under review and the number of deaths was only 200 compared with 1,368 during 1924. It is reported that the infection was freshly imported through Kanarese coolies from the Mysore State. It is hoped that now that a Health Officer for the district has been permanently sanctioned, a recurrence of this disease in its previous virulent form will be prevented. It is satisfactory that the people in the affected areas have on the whole learnt the value of the preventive measures and of the treatment, though it is reported that some of the higher castes raised strenuous opposition to the steps taken to arrest the spread of the disease.

Respiratory diseases.—The number of deaths from these diseases was 74,591 against 45,180 in 1921 and 64,782 in 1924 or 1.8 per mille of the population against 1.1 and 1.6 per mille in 1921 and 1924 respectively. The progressive increase in the number of deaths recorded under this head is attributed partly to an improvement in registration.

Hookworm.—The investigations so far carried out have shown that the disease is more or less uniformly prevalent throughout the Presidency except in exceptionally dry districts such as Bellary and Anantapur, and that it can be eradicated only if a permanent improvement is effected in rural sanitation by the provision of suitable latrines and their habitual use by the people as a whole. The Local and Municipal and Public Health Advisory Committees which were consulted in the matter, after taking into consideration the great difficulties likely to be experienced in introducing a system involving a revolution in habits which have persisted for centuries, recommended that the scheme to induce the people to use sanitary latrines should be confined at first to one or two villages, the cost of the latrines and sweepers being met by the District Board concerned. The Madura District Board has agreed to try the experiment in a few villages in that district, and has allotted the funds necessary for the purpose.

Registration of vital statistics.—In 1923 the Director of Public Health made certain proposals for the transfer of the work of registration of vital statistics from village officers to Union Boards. It was found however that the proposals could not be given effect to except by an extension of the provisions of the District Municipalities Act to the Unions on the application of the Local Boards concerned, and after consulting District and Union Boards it was seen that the majority were not in favour of the transfer. The proposal was therefore dropped during the year under review. The Director of Public Health has since reported that the Union Boards, in places where they have been entrusted with the work, do not attend to the work satisfactorily.

Since the formation of the district health staff registration of vital statistics has shown a marked improvement in rural areas; that still greater improvement is possible and necessary is shown by the fact that during 1925 the District Health Staff throughout the Presidency detected 74,128 unregistered births, thereby making possible the vaccination of a large number of infants who would otherwise have remained unprotected. There has not been a similar improvement in municipal areas, but with the increase in the number of Municipal Health Officers the registration of vital statistics in these areas should show a definite improvement.

The Director recommended during the course of the year that the form of the monthly returns received from Collectors should be amplified so as to enable deaths from typhoid fever, relapsing fever, kala-azar, influenza, etc., to be shown separately instead of being grouped under the common head "Fevers." His proposals were approved so far as municipal areas were concerned but the Government were unable to accept the suggestion in the case of rural areas as they were of opinion that the village headmen who are the sole agency for registration in this Presidency could not be relied upon to distinguished between these various kinds of disease.

Birth-rate.—There was a slight decrease in the recorded birth-rate of the Presidency from 34.9 to 33.7 per mille, all districts contributing to the decrease except Kurnool, North Arcot, Tanjore Gōdāvari East and the Agency, where an increased number of births was recorded. The birth-rate for the year was, however, higher than that for 1923 (33.1) and the average for the quinquennium 1919—23 (28.8). Except in the Madras City and the Nilgiris where the death-rate was highest, the birth-rate exceeded the death-rate in every district. The registered birth-rate in rural towns rose from 34.0 to 35.0 per mille, while that in municipal towns fell from 37.5 to 37.1. The lowest birth-rates in municipalities were again recorded in Tiruvālur (17.2) and Nandyāl (17.8) as in 1924. Other towns which returned low birth-rates are Tadpatri, Erode, Saidapet, Palacole, Ellore, Cuddapah, Srinangam, Karur, Chicucole, Proddatur and Vizianagram. The low birth-rates in these towns seem to show that registration is defective.

Death-rate.—The recorded death-rate for the Presidency fell from 24.5 to 24.4 per mille. There was a decrease in fifteen districts. The largest decrease occurred in the Nilgiri and Bellary districts, due in the former case to the successful campaign carried on against relapsing fever which had prevailed in the district in a virulent form during 1924, and in the case of Bellary to the absence of epidemics of cholera and plague and an improvement in economic conditions. The increase in the death-rate was most marked in the Madras City, the Agency Tracts and in the districts of Rāmnād and Vizagapatam. The recorded death-rate for rural towns and municipal areas rose from 24.1 to 24.8 and from 32.2 to 32.3 per mille respectively. The infantile death-rate during the year was 180.9 per mille of registered births against 179.2 in 1924, the slight increase being due to the smaller number of births registered during the year.

Maternity and Child Welfare.—The total number of deaths registered from causes associated with child birth was 3,788 or 2.7 per 1,000 births against 2,601 or 1.8 per 1,000 births in 1924. This figure does not, however, probably represent the actual mortality. The information obtained by the Director of Public Health from the 22 municipalities where health officers were employed, shows that 43,477 births and 747 maternal deaths were registered in these municipal towns during the year, giving a maternal death-rate of 17.5 per 1,000 births. This high death-rate cannot be regarded as surprising, in view of the fact that in only 6 per cent of the registered labour cases did women receive skilled attention during confinement. These facts show that extensive measures for maternity relief are urgently required, if the maternal death-rate is to be appreciably reduced. The number of Maternity Relief and Child Welfare centres was only 58 at the end of 1925, while the number of trained midwives who worked in the Presidency was only 840.

It is clear that the number of centres and midwives must be largely increased if any real improvement is to be effected. The Government have recently sanctioned a scheme for the training of "dhais" at District Headquarter Hospitals and they trust that local bodies will take full advantage of this scheme so that even in the remoter areas of the Presidency skilled attention may be made available to women during labour.

Propaganda.—Considerable attention was devoted to health propaganda during the year. As many as 52,100 lectures were delivered during the course of the year at 36,800 centres to audiences numbering approximately 2,900,000. The largest amount of propaganda work was carried out during the National Health and Baby Week. It is satisfactory that the local bodies and the public in general took an active interest in the matter and made

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the movement a success. The Director's suggestion that local bodies should make contributions to the Madras Health Council to enable it to meet its increasing expenditure is commended to the local bodies for their consideration. The Director reports that with a few notable exceptions (Cuddapah for example) no health propaganda work was carried on in those municipal towns where no health officers were employed. The Government hope that the municipal councils in these towns will realize the great value of propaganda work in the prevention of disease and will devote greater attention to this important matter.

Sanitary works.—No new water-supply or drainage scheme was brought into operation during the year. The schemes to provide a piped water-supply for Chingleput, Bellary, and Coimbatore, the construction of a service reservoir for the Negapatam water-works, and the drainage schemes for Madura and Vellore were under execution, besides several schemes for the improvement of existing water-supply systems, of which the most important were schemes to improve the supply to Coonoor, Vellore, and Salem.

The question of reorganizing the Sanitary Engineering Department so as to enable it to carry out the investigation of water-supply and drainage schemes more promptly is under the consideration of the Government. The Sanitary Engineer has also recommended that his Department should be entrusted with the execution of the schemes for which it prepares plans and estimates.

Administration.—The employment of eleven addition municipal health officers was sanctioned during the year, four of the first class and seven of the second class. At the end of the year therefore, the public health staff under the Director consisted of 3 Assistant Directors of Public Health, 55 Health Officers and 261 Health Inspectors as compared with 1 Assistant Director of Public Health, 5 Health Officers and 189 Health Inspectors in 1920.

In the concluding sections of his very able report, Major Russell has some very interesting comments to make on the general aspects of public health policy in India in general and in the Madras Presidency in particular:—

"It must be remembered that India has now taken its place as an important member of the international organizations of the world. This country is, moreover, not only the home of cholera, but is a constant potential source of infection as regards plague, small-pox and other epidemic diseases. It is, therefore, necessary to abandon the merely parochial outlook on public health questions, and to remember that the nations of the world look to India itself to do what it can, and much more than it has done in the past, to eradicate these dangerous diseases. The League of Nations Health Section has focussed the attention of the educated world on public health, to a degree which has never before been reached, and other nations will judge India and its peoples by the capacity which its internal health organizations exhibit in controlling those diseases which are a constant source of danger to the world at large.

"The first and foremost problem awaiting consideration, and probably the key to most other public health schemes in India, is rural sanitation. The International Health Board of the Rockefeller Foundation has during the last six years carried out anti-hookworm work in certain selected districts of the Presidency, and has, in addition to general surveys, conducted intensive educational campaigns in the same areas. The Government has provided annual allotments for this work, but there is a danger that the policy of the International Health Board will be lost sight of. So far as this Presidency is concerned, the hookworm campaign has not resulted in any *permanent* improvement, because there has been no practical response to the repeated warnings as regards the danger of soil pollution and the necessity for the construction and proper use of suitable private and public latrines. This is not wholly the fault of local bodies, but whatever the cause, the time has now come for making a move, and it is suggested that from now onwards Government should sanction yearly grants for this purpose. In several instances district and *taluk* boards have already sanctioned varying amounts in their annual budgets for rural conservancy, so that the need for such expenditure is being recognized. Two district boards have set aside very considerable sums for this work during 1926-27, and simultaneously with the construction of latrines, the Ankylostomiasis Bureau will carry on an intensive educational campaign, so that the scheme may be given every chance of success. Only in this way will something practical towards a general scheme of rural sanitation be carried through, and, if the present experiment proves successful, the International Health Board will be encouraged to continue its work in the Presidency instead of withdrawing altogether. It may be said that the scheme deals only with a very primitive health measure, but one must start with primitive measures amongst a population whose knowledge of Public Health is primitive.'

"Another important and much-needed reform is the framing of a Public Health Act for the Presidency which will not only embody all public health laws and regulations now scattered through a large number of minor statutes, but will put these in a form more suitable for present requirements. Government have called for detailed proposals and these will be submitted shortly.

"It is probably correct to say that nothing in the Presidency is more urgently required than safe and adequate rural water-supplies. Only then can diseases like cholera, dysentery and enteric fever be tackled in earnest. During recent years, the Public Health Department has devoted considerable time to the investigation of foci of infection as regards water-borne diseases, and the information now available would be of immense use, if Government and local bodies could set apart year by year, definite sums for the improvement and protection of water-supplies at these foci and along the known routes of spread of infection. The provision of good drinking water at such centres as Palni and Tadpatri Municipalities ought to be dealt with from the Presidency point of view, and the schemes liberally subsidized from Government funds, if, indeed, Government do not bear the whole cost. Moreover, all expenditure on rural water-supplies, specially when supplemented with Government grants such as have been made during the year, should be so arranged that the most urgent works, from the point of view of water-borne diseases, are taken up first.

"Another activity of the Public Health Department which demands immediate extension is the education of the people in hygiene. We have reached a stage in the evolution of public health where an enlightened public opinion is necessary in order to carry it further. If general education is an affair of the State, so much the more is education in matters of public health, for appreciation by the people of the value of public health measures is the surest way to gain the financial support necessary to carry out modern sanitary measures. For the last three years, the Madras Health Council has struggled with a meagre income (aided by the Red Cross Society) to do what it could in this direction. During 1925-26, Government sanctioned a grant of Rs. 13,000 to the Health Council. Of this total, only Rs. 8,000 is a recurring grant and Rs. 3,000 is earmarked for the National Health and Baby Week. How far this sum will go towards financing any adequate health education campaign for a population comprising nearly 43 millions of people and using at least half a dozen different languages can best be imagined. Unless the Health Council can find other sources of income, it may be necessary for that body to suspend its activities. In such an event, it would be essential for Government to sanction the establishment of a health propaganda section under the charge of a suitably qualified officer in the office of the Director of Public Health. The importance and value of health propaganda work has been so definitely established, that it would be impossible to ignore the demands for its continuation in one form or another.

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"As an indication of the expansion of the Public Health Department during the past five years, the following figures may be of interest:—

	1920	1926
Assistant Directors of Public Health	1	3
Health Officers	5 (Not Provincial)	55
Health Inspectors ..	109 + 80 (Cholera parties)	261

"Most local boards allot small grants in their annual budgets for rural sanitation, but this money is not always spent to the best advantage. It has been suggested in a circular issued to all District Health Officers that they should select one or more villages in suitable parts of their districts, and persuade the local boards to utilize the sanctioned grants in carrying out sanitary improvements in these villages. In other words, an attempt should be made to have a few "model" villages in each district. District Health Officers and Health Inspectors should make frequent inspections and should encourage the visits of local board members. All expenditure should be closely supervised and village committees might raise sufficient enthusiasm to ensure the observance of sanitary rules. These villages, if suitably selected, should serve as a practical illustration of the advantages of a hygienic environment to a large proportion of the population, and thus help to create a demand for better conditions in other villages and towns, whilst some return for the expenditure made would be apparent."

Correspondence.

MEDICAL EDUCATION AND REGISTRATION IN INDIA.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—During a stay of four years in Europe, I have been especially interested in the subject of medical education and registration in European countries, have attended various conferences in Berlin and Paris dealing with the subject, and interviewed the President and Chairman of the Educational Board of the General Medical Council of Great Britain. In India matters in this connection are in such a backward state that they call for reform. One would suggest that such measures as the following are urgently needed:—

(1) The establishment of a central Council of Medical Education and Registration for all-India, to be composed of members representative of the different provincial Medical Councils, the different medical colleges and schools in India, and of the medical profession in the country in general.

(2) The appointment of an official Inspector of medical examinations, colleges and schools in India—an appointment to be made by the India Office in collaboration with the General Medical Council of Great Britain. I understand that, as far as the medical examination of those Indian universities whose degrees are recognised by the General Medical Council of Great Britain are recognised, this step has already been taken, but perhaps wider powers and more extensive inspection are needed. Inspection should also take place of the courses of study and examination held by the different women's medical schools in India.

(3) The drawing up of an Indian Pharmacopœia, published under the direction of the proposed all-India Council of Medical Education and Registration. A Pharmacological Society for India should be established with various local centres for teaching and examining. Systematic research is also called for in connection with the indigenous systems of medicine in India under the direction of some such body.

(4) A liaison officer should also be appointed to visit the various centres of medical teaching and examination in Europe, England and America, and to make reports on the methods there current to the Council in India.

(5) One—or possibly two—representatives from India should be appointed to the General Medical Council of the United Kingdom. One European and one Indian representative would be the best.

(6) There is urgent need for the establishment of a Dental School for India, of the passing of an Indian Dental Registration Act, and the setting up of an Indian Dental Board.

(7) The rules with regard to medical registration in the various colonies of the Empire require to be studied, and some uniformity introduced with regard to mutual recognition and registration *vis-à-vis* India.

(8) Legislation is needed in India with regard to the appointment and powers of coroners, the registration of births and deaths, the registration of nursing homes, and with regard to dangerous drugs.

(9) The preliminary scientific examinations leading up to a medical career should be held three times a year, and the courses for them should be made more elastic; thus logic should be made one of the optional subjects, and French and German should be introduced as secondary languages.

(10) There is urgent need for the extension of voluntary hospitals in India; also for the closer association of the independent medical profession in the country with State-aided hospitals, and for the training of a class of ward-assistants who will not be qualified medical men, but who should be available for city as well as for *mofussil* hospitals and dispensaries.

(11) The progress of medicine in India would be greatly assisted by the formation of an Indian Medical Association on the lines of the British Medical Association, the American Medical Association, and the medical associations of other countries.

Among various minor reforms called for are that every medical college and school in India should issue a printed syllabus shewing exactly the character and details of the various courses of study pursued, and the names of its tutorial staff. Many such institutions already do so, but others do not. Study tours for students might also be instituted, for travelling in itself is an education, and exchanging of ideas one of the best methods of learning. An all-India medical students' conference also suggests itself.

There is no doubt that if a comprehensive survey were made of the conditions of medical education and registration in India, very important reforms could be instituted, with great benefit to the country.—Yours, etc.,

K. M. HIRANANDANI.
Sub-Assistant Surgeon.

HYDERABAD, SIND,
15th September, 1926.

A CASE OF ACUTE GLOSSITIS.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—The publication on p. 448 of your issue for September 1926 by Dr. Gopal Singh Chawla of a case of acute glossitis reminds me of a similar case seen by me in this district in April 1925. Details of the case are as follows:—

The patient, a Hindu male, aged about 50 years, was brought to this dispensary on the evening of the 1st April 1925 in a cart. He was partly unconscious and had to be carried to the ward. He was restless and with a flushed face; the tongue was purple in colour, hugely swollen, and protruding for more than an inch outside the mouth, with a constant dribble of saliva from the angles of the mouth. His temperature was 104°F., pulse fairly good, respirations quickened and impeded; the heart and lungs appear to be normal, the liver and spleen not enlarged, but the abdomen a little distended.

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His relatives stated that when taking his evening meal on the previous night he had suddenly complained of pain at the base of the tongue. Next morning fever ensued and the swelling of the tongue commenced. As they objected to my using a knife, I had recourse to the hypodermic syringe and injected 6 m. of tincture of iodine in 2 c.c. of distilled water intravenously. A dose of calomel gr. iv. with sodium bicarbonate was introduced into the mouth with difficulty, and an enema given.

That night he had a severe reactionary temperature and profuse sweating, but next morning the temperature was only 99.8°F. and the tongue considerably reduced in size. He could not speak, but made signs. On examination of the tongue superficial ulcers covered with thin whitish yellow sloughs were seen situated on the upper and left lateral part of the posterior third of the tongue, close to some sharp-edged and dirty molar teeth. Permanganate and alum mouth washes were now prescribed, and Mist. Salina with potassium iodide. The temperature dropped to normal by 4 p.m., but the patient was still unable to speak. By the 5th April he had made a complete recovery and spoke normally.

Having no microscope in my dispensary, I was unable to incriminate any causative organism, and had to content myself with a diagnosis of acute ulcerative glossitis.—Yours, etc.,

S. K. BHAVE,

Medical Officer, Hirekerur, Dharwar District, Bombay Presidency.

21st October, 1926.

A FATAL CASE OF INFECTION WITH *ASCARIS LUMBRICOIDES*.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—Dr. Nauhorya's notes in your issue for August 1926 on a case of acute intestinal obstruction caused by *Ascaris lumbricoides* remind me of a typical case seen by me some ten years ago, when a medical student of the Berry-White Medical School, Dibrugarh.

The patient, an adult Hindu male, was admitted to hospital with all the clinical signs and symptoms of acute intestinal obstruction, but the presence of roundworms was not for a moment suspected. He was operated upon by Dr. H. K. Das, L.M.S., then Teacher of Surgery at the School, and now Civil Surgeon of Nowgong, Assam. At operation about 500 roundworms were removed, and when placed in a bowl presented a truly remarkable sight. In spite of all precautions taken the patient unfortunately died on the table before the operation was completed.—Yours, etc.,

M. BAROOA, L.M.P.

MANCOTTA TEA ESTATE,
DIBRUGARH P. O., ASSAM,
15th October, 1926.

A CASE FOR DIAGNOSIS.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—With reference to the note on p. 526 of your issue for October 1926, under this heading, may I suggest that it was the injection of atropine on a hot day in the Punjab that caused the rise of temperature described?

Some years ago a patient with acute rheumatic fever was given an injection of morphine and atropine by the family physician, and at 10 p.m. suddenly developed a temperature of 107°F., about half an hour after the injection. The temperature at the time of injection was only 101°F. This case occurred in May 1921, and the patient was dead before any doctor could be called in.—Yours, etc.,

BRIJ RAJ KISHORE, B.SC., M.B., B.S.

THE JUMNA DISPENSARIES,
ALLAHABAD CITY,
16th October, 1926.

INTRAMUSCULAR QUININE IN MALARIA.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—I have seen the correspondence on this subject in two or more numbers of the *Gazette*, and perhaps I may be permitted to record my experience in it. Some years ago I was in charge of a hospital in a malarious district, and, if my memory serves me right, I had occasion to treat about 740 cases microscopically proved to be malaria in 2 years and 10 months' time. I administered over 3,000 intramuscular injections of quinine during this period and a few intravenous injections also. I met with no unpleasant results whatever. I might say that I had only 3 abscess formations in the whole series. I fail therefore to appreciate the fears expressed by your correspondents, and in my opinion, if due care be taken, quinine can be administered intramuscularly without any untoward consequences.—Yours, etc.,

F. CHRISTIAN, M.R.C.S., L.R.C.P., L.M.

VAJIRA HOSPITAL,
BANGKOK,
26th October, 1926.

PNEUMOPERITONEUM IN RADIOGRAPHY.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—In your review of my book "A descriptive Atlas of Visceral Radiograms" in your issue for September 1926, p. 470, you note the omission from it of the method of inducing pneumoperitoneum in radiography of the viscera. I am not a radiologist, but see a good deal of *x*-ray work, and have only actually seen one pneumoperitoneum. I understand that the method is accompanied by more danger than its results would warrant. I may add that it is rarely done in this country.

I should be grateful if you would make a note of this in your columns.—Yours, etc.,

A. P. BERTWISTLE, M.B., CH.B., F.R.C.S. (Ed.).

4, SPITAL SQUARE,
BISHOPSGATE,
LONDON, E.C.

OBITUARY.

THE LATE DR. H. M. CRAKE.

IT is with the deepest regret that we have learnt of the recent death at Home of Dr. H. M. Crake, Health Officer to the Calcutta Corporation. "Like many other medical men, Dr. Crake knew that he was engaged in a war with conditions that he could not hope to see swept away in his lifetime" remarks the *Statesman*. "Religious and social forms were all the time fighting against his desire to bring light into the dark places of the city. His epitaph must be that he wore himself out in public service, content that at the end of the day a little progress should have been made."

Dr. Crake came out to India first as one of the special officers appointed by the Secretary of State in 1898-1899 on the first outbreak of plague in Calcutta, his services being retained in that capacity until 1906, when he was appointed a District Health Officer. His work in connection with the sanitary survey of Burra Bazar and other congested areas of Calcutta City prepared data of very great value for the new thoroughfares and town-planning activities of the Calcutta Improvement Trust. In 1913 he was appointed Health Officer to the Calcutta Corporation and was re-appointed to the same post in 1923, and again in 1926. Much of his energy in Calcutta was devoted to the establishment and extension of maternity and prenatal welfare centres and schemes, and the infantile mortality in Calcutta was always the subject of his closest attention. In conjunction with the Calcutta School of Tropical Medicine he took vigorous steps to deal with kala-azar in the city, whilst the terrible incidence of tuberculosis and its special association with

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Infant Feeding

Dr. Still cautions against "using a proportion of fat which exceeds what one may call Nature's limit, the 3 or 4 per cent. which is present in human milk." *(Common Diseases and Disorders of Childhood, 4th Edition, p.241).*

Buffalo milk may contain 8 or 9 per cent. of fat and is obviously unsuitable for infant feeding.

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"I can't be away from the Office"

The best prophylactic treatment for Influenza is the support of the adrenal glands, which are a part of the detoxicating, immunising mechanism of the body.

When the adrenals fail, through over exertion, to perform their normal functions, such conditions as colds, low blood pressure, subnormal temperature, and asthenia naturally follow.

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the *purdah* system were subjects to which he frequently drew attention.

Dr. Crake was one who believed in co-operation. His presence at the monthly staff conferences at the Calcutta School of Tropical Medicine was always very welcome, and his advice and information at such conferences invaluable. We have reviewed many of his annual reports in our columns, and there were no reports of greater interest; from first to last he visualised and grasped the conditions present in this great and crowded city, planned well and wisely for their amelioration, and strove for reform. In Dr. Crake Calcutta has lost one of her foremost and most energetic of pioneers.

"I first came in contact with Dr. Crake," writes a contributor (A. D. S.), "in connection with the yearly Health Exhibitions held during Baby Week. Afterwards we had many mutual consultations on various matters of public health interest. I was very early impressed by Dr. Crake's openness of character, his honesty of purpose and his generous nature; by his lively appreciation of any advances in medical knowledge and his quick adaptation of these to the need of the city under his care. His views on health matters were broad and he was in no way parochial in his outlook; any request for advice and help or co-operation was met at once with ready and immediate response.

"Dr. Crake's organisation for dealing with the annual passage of many thousands of pilgrims through Calcutta was not only of benefit to the people of Calcutta, but to Bengal also, and indeed to the whole of India. His knowledge, experience, and temperament made him an ideal colleague, and not only Calcutta but the province of Bengal has lost a valuable worker and well wisher."

Service Notes.

APPOINTMENTS AND TRANSFERS.

Brevet-Colonel R. A. Needham, C.I.E., D.S.O., M.D., I.M.S., is placed on special duty under the Director-General, Indian Medical Service, as Inspector of Medical Education on behalf of the General Medical Council of the United Kingdom with effect from the 22nd October 1926.

Lieutenant-Colonel J. C. H. Leicester, M.D., F.R.C.P., F.R.C.S., V.H.S., I.M.S., is appointed to officiate as Surgeon-General with the Government of Bengal, with effect from the 2nd November 1926 and until further orders.

Lieutenant-Colonel H. Innes, M.D., I.M.S., is appointed to officiate as Inspector-General of Civil Hospitals and Prisons, Assam, with effect from the 1st November 1926 and until further orders.

Lieutenant-Colonel R. F. Baird, I.M.S., is appointed to officiate as Inspector-General of Civil Hospitals, United Provinces, with effect from the 9th October 1926 and until further orders.

Lieutenant-Colonel G. Tate, M.B., V.H.S., I.M.S., Professor of Midwifery, King Edward Medical College, Lahore, is appointed to be Inspector-General of Civil Hospitals, United Provinces, with effect from the 9th November 1926.

The undermentioned officers are appointed substantively to the Medical Research Department with effect from the dates mentioned against their names:—

Captain A. C. Craighead, M.B., I.M.S. 1st July 1926.

Lieutenant-Colonel R. McCarrison, C.I.E., M.D., I.M.S. 29th July 1926.

Major V. B. Green-Armytage, M.D., I.M.S., Second Professor of Midwifery and Gynæcology, Medical College, Calcutta, is appointed to act as Professor of Midwifery, Medical College, Calcutta, and Obstetric Physician and Surgeon, Medical College Hospitals, with effect from the afternoon of the 1st November 1926, vice Lieutenant-Colonel J. C. H. Leicester, V.H.S., I.M.S.

Major E. W. O'G. Kirwan, M.B., F.R.C.S.I., I.M.S., officiating Professor of Ophthalmic Surgery, Medical College, Calcutta, and Ophthalmic Surgeon, College Hospital, is appointed to act as Civil Surgeon, Mymensingh, with effect from the date on which he joins the appointment.

Major W. P. Hogg, D.S.O., I.M.S., is appointed to officiate as an Agency Surgeon, and is posted as Civil Surgeon, Quetta, with effect from the 9th October 1926.

On return from the Andaman and Nicobar Islands, Major G. Covell, M.D., I.M.S., resumed charge of his appointment as officiating Assistant Director, Central Research Institute, Kasauli, with effect from the forenoon of the 29th September 1926.

Major P. C. Banerji, I.M.S., Resident Surgeon, Medical College Hospitals, Calcutta, is appointed to act, in addition to his own duties, as Resident Physician of that institution, with effect from the afternoon of the 7th May 1926 until further orders.

Major R. F. D. MacGregor, M.C., I.M.S., an officiating Agency Surgeon, is appointed to officiate as Residency Surgeon, Indore, with effect from the 28th September 1926 and until further orders.

Major A. N. Dickson, M.C., I.M.S., Agency Surgeon, Bundelkhand, is appointed to officiate as Administrative Medical Officer in Central India, in addition to his own duties, with effect from the 28th September 1926 and until further orders.

The services of Captain J. C. Chukerbutti, M.B., I.M.S., are placed temporarily at the disposal of the Government of Bengal, with effect from the date on which he assumes charge of his duties.

Captain Mahdo Prasad, M.B., I.M.S., was restored to the Active List with effect from the "16th February 1925" and not from the "6th March 1925" as notified in the London Gazette dated 1st May 1926.

Subject to His Majesty's approval, the undermentioned officer has been appointed permanetly to the Indian Medical Service, as Lieutenant by the Right Hon'ble the Secretary of State for India. His Commission will bear date 31st March 1925.

Thomas Arthur Doran, M.B.

The undermentioned gentlemen to be temporary Lieutenants, subject to His Majesty's approval:—

Dhirendra Nath Basu, M.B. Dated 5th September 1926.

Hardit Singh Ahluwalia, M.B., B.S. Dated 8th September 1926.

Bonbehari Bhattacharji, M.B. Dated 9th September 1926.

Frederick Placidus Lisboa-Pinto. Dated 10th October 1926.

Benegal Mukunda Rao, M.B., B.S. Dated 6th November 1926.

Nasiruddin Ahmed, M.B., B.S. Dated 18th October 1926.

LEAVE.

Colonel A. W. R. Cochrane, M.B., F.R.C.S., I.M.S., Inspector-General of Civil Hospitals, United Provinces, is granted leave on average pay for 5 months and 27 days combined with leave on half average pay for 1 year, 10 months and 3 days, with effect from the 9th October 1926.

Lieutenant-Colonel W. R. Battye, D.S.O., I.M.S., an Agency Surgeon, is granted leave on average pay for 1 month and on half average pay for 5 months under Fundamental Rules, with effect from the 28th September 1926.

In modification of this Department Notification No. 1397, dated the 13th October 1926, Colonel C. H. Bensley, C.I.E., K.H.P., I.M.S., Inspector-General, Civil Hospitals and Prisons, Assam, is granted 4 months leave on average pay, preparatory to retirement, with effect from the 1st November 1926 or any subsequent date on which he may avail himself of it.

Lieutenant-Colonel F. E. Wilson, I.M.S., an Agency Surgeon, is granted leave on average pay for six months under the Fundamental Rules with effect from the 9th October 1926.

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PROMOTIONS.

Lieutenant-Colonel to be Colonel.

George Browse, D.S.O., M.D., vice Colonel Edgar Francis Eardley Bains, D.S.O., retired. Dated 10th October 1926.

Captain (now Major) A. MacD. Dick, O.B.E., F.R.C.S., I.M.S., is granted the acting rank of Major from 4th January 1918 to 1st October 1918 and from 14th October 1918 to 8th October 1920 and is granted the acting rank of Lieutenant-Colonel from 2nd to 13th October 1918, whilst serving with the Mesopotamian Expeditionary Force.

Lieutenant to be Captain.

Thomas Arthur Doran, M.B. Dated 23rd May 1925.

Temporary Lieutenants to be temporary Captains.

Subbier Annaswami. Dated 3rd October 1926.
Sarveshwar Nath Kaul. Dated 4th October 1926.
Hari Narain Shivapuri. Dated 5th October 1926.
Amar Nath Duggal. Dated 12th October 1926.
Homi Meherjibhoy Setna. Dated 14th October 1926.
Bankim Kumar Pal. Dated 15th October 1926.
Chandranan Joshi. Dated 20th October 1926.
Bakhtyar Rustomji Hakim. Dated 29th October 1926.
Kongattil Madhava Menon. Dated 31st October 1926.

RESIGNATIONS.

Lieutenant Ragade Sanjiva Rao. Dated 31st October 1926.

Lieutenant Ponathil Balakrishna Kurup. Dated 1st November 1926.

RETIREMENT.

The King has approved the retirement of Colonel E. F. E. Baines, D.S.O., I.M.S., with effect from the 10th October 1926.

MISCELLANEOUS.

Subject to His Majesty's approval, the date when mobilized service began, the date of appointment and the date of rank of the undermentioned officers are as noted below. They will take their seniority in the service accordingly:—

NAME.	Date when mobilized service began.	Date of appointment.	Date of rank.
Captain R. W. H. Miller, M.B.	10-4-1920*	28-1-1925	10-4-1923
Captain G. J. Smith, M.B.	7-4-1921*	3-3-1925	7-4-1924
Lieut. S. P. Joshi, M.B.	25-5-1923	20-5-1925	25-5-1923
,, T. J. Davidson, M.B.	6-6-1923*	22-12-1923	6-6-1923
Lieut. S. D. Gupta, M.B.	7-8-1923	20-5-1925	7-8-1923
,, E. G. Michelson, M.B.	9-9-1923*	29-11-1923	9-9-1923
Lieut. K. M. Bharucha, M.B.	13-10-1923	20-5-1925	13-10-1923
Lieut. D. MacD. Fraser, M.B.	25-2-1924*	28-1-1925	25-2-1924
Lieut. S. C. H. Worseldine	14-4-1924*	3-3-1925	14-4-1924
Lieut. M. K. Afridi, M.B.	1-8-1924	20-5-1925	1-8-1924
Lieut. G. S. Chawla, M.D.	9-8-1924	20-5-1925	9-8-1924

* Grading after allowing for break in service.

NOTES.

MESSRS. NEWTON AND WRIGHT'S PRICE LIST OF ELECTRO-MEDICAL APPARATUS.

WE have received from Messrs. Newton and Wright, 471|3, Hornsey Road, London, N. 19, a copy of their very interesting illustrated price list of electro-medical apparatus. This deals with faradic batteries, galvanic batteries, combined batteries, switchboards, sinusoidal apparatus, their Omnistat universal machine, electrodes and accessories for electro-medical applications, the Bergonie apparatus, electric cauteries, mechanical vibrators for massage, and heat and light baths. The catalogue will be of interest to medical men working in this line; whilst other catalogues dealing with apparatus for ultra-violet therapy, diathermy, and *x*-ray work can be obtained post free upon request.

CLEAN AIR.

A NEW apparatus which has aroused considerable interest of late in the London newspapers, and which will interest the medical profession in India is the "Andrew air filter," manufactured by Air Filters, Ltd., Fitzalan House, Arundel Street, London, W.C. 2. The principle of this apparatus, which is electrically driven, is to suck in contaminated air through a perforated cone, pass it through a perforated charcoal container to purify it, then through medicated peat, and finally out again. A demonstration was given at a boxing match in Blackfriars Road, London,—one of the most slummy areas of London—on September 13th, 1926. Ordinarily the atmosphere in this room is such that one can hardly see through it for tobacco smoke and dust. Five air filters were fitted, and according to the London newspapers "the air was as pure as one could hope to find on Dartmoor."

It is claimed for these air filters that they will cleanse any stuffy or tainted atmosphere, sterilize a sick room after epidemic disease, circulate 360 cubic feet of air per minute on a very low electric current consumption, clear fog, smoke, and all taint of tobacco from closed rooms, and exterminate flying insects such as mosquitoes. It is obvious that the special use in India for such an apparatus will be in cinemas, theatres, and lecture halls, but it may also be of great value in operating theatres, surgical wards, nursing homes, etc. The apparatus is claimed to be fool-proof, with a self-lubricating motor, and thoroughly insulated, whilst it is of a convenient size and weight for easy transfer from room to room. The Indian agent is H. Rolfe, P. O. Box 186, Calcutta.

Publishers' Notice.

SCIENTIFIC Articles and Notes of interest to the profession in India are solicited. Contributors of Original Articles will receive 25 reprints *gratis*, if asked for at the time of submitting their manuscripts.

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Original Articles.

A NEW CONCEPTION OF THE EPIDEMIOLOGY AND ENDEMIOLOGY OF CHOLERA.*

By J. W. TOMB, O.B.E., M.D., D.P.H.,

Chief Sanitary Officer, Asansol Mines Board of Health

and

G. C. MAITRA,

CAPT., I.M.S.,

Research Worker, School of Tropical Medicine and Hygiene, Calcutta.

(*Mining Association, Endowment.*)

CHOLERA was attributed by Koch in the year 1883 to the presence in the human intestine of a "comma-bacillus" or vibrio possessing certain morphological and cultural characteristics. As man alone amongst animals is subject to cholera, it is impossible to satisfy Koch's own postulates regarding the causal relationship of this vibrio to the disease. Nevertheless, the "comma-bacillus" or vibrio of Koch is generally accepted as the causal organisim of cholera. In addition to the morphological and cultural characteristics of the vibrio as originally described by Koch, later observers added the serological characteristic of "specific agglutinability" and claimed that vibrios not possessing this agglutinability were not "true" cholera vibrios, though in every other respect indistinguishable from the vibrio described by Koch.

Further investigations revealed the fact that sporadic cholera—a disease indistinguishable clinically from epidemic cholera—is very constantly associated with non-agglutinating vibrios which differ from the vibrio of Koch in "agglutinability" alone.

Extended search by many observers in many parts of the world also proved that no chronic carriers of agglutinating vibrios could be demonstrated; nevertheless, it was inferred on the analogy of carriers of the *Bacillus typhosus* that such carriers of agglutinating vibrios must exist and that the disease lay dormant in these carriers in the intervals between epidemic outbreaks, in spite of the fact that all attempts to demonstrate such carriers had proved negative. Spontaneous outbreaks of epidemic cholera had also been observed to occur in many places where no history of immediate infection from any outside source could be obtained or be reasonably inferred.

It was also frequently assumed that Bengal was the only endemic home of cholera and that every outbreak of cholera in every other country of the world could theoretically be ultimately traced to its origin in Bengal. Our researches however into cholera in the endemic area of the Asansol Mining Settlement, Bengal, have led us to a new conception of the epidemiology as well as the endemiology of this disease.

In the first place, it was observed by us that during the dry hot weather in the Asansol Mining Settlement (March to June) vibrios were very numerous in the ponds or ground tanks much frequented by the inhabitants of the Settlement for washing after defæcation. On washing being prohibited in these tanks under the *Regulations for the Prevention and Control of Cholera in the Asansol Mining Settlement,* it was found that vibrios gradually diminished in number and always disappeared after 12 to 14 days. We, therefore, concluded that the vibrios found by us in these tanks were derived from pollution of the water with human fæces, but when we attempted to isolate vibrios from the stools of those frequenting the tanks our efforts were a complete failure. As there could be no doubt, however, that the source of the vibrios in the tanks was the human intestine, we concluded that the ordinary peptone enrichment process for isolating vibrios from solid stools was unsatisfactory. We therefore set out to discover a method modelled on Nature and after much experiment by trial and error devised what we shall refer to as the "open-bowl" method of cultivating vibrios from stools, which was fully described in the *Indian Medical Gazette* of February 1926, p. 56 and November 1926, p. 537. The method briefly is as follows:—

Enamelled bowls of 500 c.c. capacity are used, each containing 250 c.c. of 1 per cent. salt solution together with a few c.c. of 1 per cent. peptone solution.

Each whole stool is first thoroughly emulsified in 400 c.c. of 1 per cent. saline solution and allowed to settle for 6 hours in a conical glass; 40 to 50 c.c. of the clear supernatant fluid being then inseminated into one of the enamelled bowls.

For the examination of stools of cholera cases and also as a rule of cholera contacts, a different method is used. Small quantities of the cholera stools to be examined are first inseminated by means of dry pieces of wood or twigs from a neighbouring tree into large test tubes (6 in. × 1 in.) containing 10 to 15 c.c. of 1 per cent. salt solution. To the salt solution in those test tubes we have found that the addition of peptone is unnecessary, since 1 per cent. salt solution is a selective medium in which vibrios temporarily multiply whilst other fæcal organisms are either held in check or die out.

On the arrival of the test tubes in the laboratory, or after 2 to 6 hours at room temperature, about six large loopfuls of the surface liquid in the tubes are inseminated into the bowls described above.

The inoculated bowls in both cases are left in lockers at room temperature, protected from dust and air, a few loopfuls of the surface layer of the

* A paper read at the Indian Science Congress, Lahore, January 1927.

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bowls being tested daily for the presence or absence of vibrios by intensive methods of cultivation through peptone medium and subsequent plating out on bile-salt agar. Should vibrios not appear in the bowls within one week they are considered negative. In positive cases, vibrios as a rule, appear within two to three days, and when abundant, persist in the bowls up to four weeks.

By means of the "open-bowl" method we have been able to prove that in many localities of the endemic area of the Mining Settlement as many as 35 per cent. of the inhabitants are chronic carriers of non-agglutinating vibrios.

With regard to clinical cholera we early ascertained as mentioned above that two bacteriological types existed—sporadic cholera and epidemic cholera. Sporadic cholera we found in every respect identical with epidemic cholera, save only in its apparently non-infectious or feebly infectious character and in the fact that it is associated with "non-agglutinating" vibrios. Mackie and Storer(1) however have recorded an outbreak of clinical cholera in a military hospital in Alexandria, which was due to non-agglutinating vibrios. They also cite the case of a human volunteer who developed severe symptoms of clinical cholera after experimental ingestion of non-agglutinating vibrios, and our experimental rabbits after intravenous injection of these vibrios invariably suffered from severe diarrhœa and toxæmia. Epidemic cholera on the other hand is highly infectious and is constantly associated with "agglutinating" vibrios—sometimes however of varying degrees of "agglutinability." It is obvious therefore that "agglutinability" in a vibrio is not essential for the causation of the symptom-complex known as cholera, though the communicability of the disease would seem to be closely associated with this characteristic.

In our efforts to demonstrate the identity of agglutinating and non-agglutinating vibrios found in cases of clinical cholera, we first attempted to convert the non-agglutinating into the agglutinating form by animal experiments.

With this object in view we injected a non-agglutinating vibrio intravenously into a rabbit and on the unexpected death of the rabbit after six days we recovered a partially agglutinating vibrio from its gall-bladder, which was found to be capable of absorbing about 80 per cent. of the agglutinin from high titre Koch's serum.

In another instance we made a vaccine of a non-agglutinating vibrio obtained from a case of sporadic cholera and injected it intravenously into a human volunteer having no agglutinin in his blood for Koch's vibrio. The serum of this volunteer was then found to be able partially to agglutinate Koch's vibrio (1:20).

Our efforts to convert the non-agglutinating into the agglutinating form, while proving that the two vibrios are closely allied serologically, were however inconclusive and inconstant in results. We therefore decided to abandon this idea and to attempt the conversion of the agglutinating into the non-agglutinating form instead.

For this purpose a fresh cholera stool which was subsequently proved in the laboratory to contain great numbers of agglutinating vibrios was inseminated into a ground tank, the water of which had also been proved to be free of vibrios. Samples of the water of the tank in the vicinity of the inseminated stool were then tested every two hours and it was found that the agglutinating vibrios in the cholera stool permanently changed *en masse* into the non-agglutinating form under natural conditions in the ground tank after 12 to 14 hours. This experiment we repeated several times with the same result. Laboratory cultures of Koch's vibrios were also similarly tested and were found to change into the non-agglutinating form after 24 to 36 hours. Agglutinability is therefore mainly an artificial property developed and fixed by laboratory cultivation, since laboratory cultures of agglutinating vibrios take approximately three times as long as the vibrios in the stools from which they are derived to lose their agglutinability under natural conditions in ground tanks.

Extended examinations of the stools of epidemic cholera convalescents showed that 80 per cent. of these convalescents became chronic carriers of non-agglutinating vibrios, the agglutinating form permanently disappearing from the within two to four weeks.

An identical loss of "specific" agglutinability in the Shiga-Flexner group of *B. dysenteriæ* in the intestines of survivors of bacillary dysentery has recently been described by Calalb(2). Analogous serological variations are also recorded by Greig in a "water" vibrio(3); by Cunningham in the spirochæte of relapsing fever(4); by Uhlenhuth and Grossman in the leptospiræ of Weil's disease(5) and by workers in South Africa in the *Bacillus pestis* of plague(6). Five per cent. of healthy contact carriers of agglutinating vibrios, likewise become chronic carriers of non-agglutinating vibrios, the remainder freeing themselves altogether of vibrionic infestation within two four weeks.

Furthermore, it has been a matter of common observation in many countries where cholera occurs in epidemic form, that during epidemics (due to agglutinating vibrios) non-agglutinating vibrios invariably appear in great numbers in contaminated water supplies (sewers, etc.), the non-agglutinating vibrios disappearing *pari passu* with the disappearance of the epidemic.

Vibrios of varying degrees of agglutinability have also been found by us in eleven cases of epidemic cholera, and in two cases we have isolated both non-agglutinating and agglutinating vibrios from the same cholera stool.

In the laboratories of the Department of Public Health in Egypt vibrios agglutinating with standard serum only below 1:1000 are not considered "true" cholera vibrios.

After examination of thousands of stools we have been unable to discover one permanent carrier of agglutinating vibrios in the Mining

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Settlement and no such carrier has ever been reported by any other observers elsewhere.

We have therefore been driven to the unavoidable conclusion that the non-agglutinating vibrio (which is itself capable of causing clinical cholera) takes on the agglutinating characteristic under certain bio-chemico-physical conditions in the human intestine the nature of which are at present unknown, and in this mutation or epidemic form is the cause of epidemic cholera, since it is not unreasonable to assume that a characteristic so unstable may as easily be acquired as lost.

Non-agglutinating intestinal vibrios therefore in our opinion constitute the reservoir of cholera both epidemic and endemic, the degree of non-agglutinability in a vibrio apparently depending not only on the nature of its surroundings but also on the period of time which has elapsed since it last existed in agglutinating or epidemic form. The nearer to the threshold of agglutinability a non-agglutinating vibrio is, the more closely would it seem to be allied both serologically and epidemiologically to the agglutinating vibrio.

During the cold weather in the Mining Settlement (November to February) vibrios are so scarce as to be practically non-existent in the water of ground tanks commonly used by the inhabitants for the double purpose of bathing and drinking, but with the onset of the hot weather (March) they begin to make their appearance and become very numerous as the hot weather advances. It was observed by us that during the hot weather thunder-showers always considerably increased the numbers of vibrios demonstrable in the tanks. In this connection it is of interest to note that small showers during the hot dry weather are popularly credited in those parts of Bengal where cholera is epidemic at that season of the year with the capacity of increasing the intensity of existing cholera epidemics. Chemical analyses of surface washings after these thunder-showers showed that the percentage of salts as well as of organic matter in them is very high. This would reasonably account for the exacerbation of existing epidemics owing to the rapid multiplication of vibrios in infested tanks following the increase of their saline and organic contents. With the establishment of the monsoon, vibrios decrease greatly in numbers and are even found temporarily to disappear when rain falls continuously for one or more days. During breaks in the monsoon, however, vibrios are always to be found in considerable numbers in ground tanks.

The curve of cholera in the Asansol Mining Settlement was found by us very closely to follow the curve of the vibrionic contents of surface water supplies (ground tanks), the annual epidemic season being confined to the hot weather (March to May) when vibrios are very numerous, with occasional epidemic outbreaks throughout the rains when vibrios are often present in considerable numbers, followed by a period of almost complete quiescence during the cold dry season when vibrios are extremely scanty or non-existent. It is to be noted that the annual rise and fall of the number of vibrios in ground tanks, although closely related to the epidemic curve of cholera, is entirely independent of the actual *existence* of cholera in epidemic form and occurs whether cholera exists or not.

The endemicity of cholera in any locality in our opinion depends primarily upon the existence in the community of great numbers of (healthy) carriers of non-agglutinating vibrios; secondly, on the occasional conversion in the intestines of a proportion of these carriers—by some vital process—of the non-agglutinating vibrio into its mutation form the agglutinating vibrio; thirdly, upon the widespread and continued pollution of drinking water supplies (generally surface water supplies, i.e., ground tanks) with this mutation form through the unhygienic habits and customs of the people; and fourthly, upon the capacity of vibrios to persist or multiply in the drinking water supplies of the locality owing to climatic conditions, a vicious cycle being thus established.

When once therefore cholera has been introduced into a community in widespread epidemic form, great numbers of chronic carriers of non-agglutinating vibrios remain—apparently for years—amongst whom cholera of the sporadic or the epidemic type may occur at any time, and if owing to the unhygienic habits and customs of the people drinking water supplies are habitually contaminated by them, then cholera will become endemic in such a locality, provided that the climatic conditions are suitable for the survival and multiplication of vibrios in the drinking water supplies.

On the contrary where wholesale pollution of drinking water supplies does not occur, or where conditions are unfavourable to the persistence or multiplication of vibrios in the drinking water supplies, cholera cannot become endemic. In these circumstances also epidemic outbreaks, if such occur, cannot become widespread or sustained in character and will "fizzle out," as they are reported by Col. Gill ordinarily to do in the Punjab during the hot dry weather.(7) Cholera, therefore, in our opinion can only become epidemic in any locality during those periods of the year when owing to climatic conditions vibrios are capable of persisting or multiplying in the drinking water supplies of that locality.

We also venture to predict that in the deltaic area of Bengal, vibrios will be found to persist or multiply in the surface water supplies of that area at the two periods of the year only when cholera is ordinarily epidemic there, one during the hot dry weather immediately before the annual inundation of the country and the other immediately after the inundation has subsided while temperature is still high and before the onset of the cold weather, the flooding of the

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country during the rains as well as the fall in temperature during the cold weather being both unfavourable to the growth or persistence of vibrios in the surface water supplies there.

On the other hand, in the dry and arid regions of North-Western India, the epidemic season of cholera is in general confined to the rains, since only during that season is there the necessary amount of surface water, as well as the necessary temperature (associated with the insanitary habits of the people) to make an epidemic of cholera possible.

Where the percentage of chronic carriers of non-agglutinating vibrios remains small, spontaneous outbreaks of cholera will be infrequent, and in such areas cholera if it occurs at all will be chiefly an imported disease.

We have been unable to ascertain by experiment whether or not the agglutinating vibrio immediately after it has lost agglutinability is still capable of conveying epidemic cholera, but from our combined observations in the field and laboratory we conclude that the vibrio is capable of conveying cholera for some time after agglutinability has been lost, and a probable instance of this kind has been recorded by Chalmers and Westerfield as having occurred in Gindha.* An additional factor, therefore, in the spread of epidemic cholera is the period of time which has elapsed between the contamination of drinking water with the agglutinating vibrio and its ingestion as a non-agglutinating vibrio by non-immunes.

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RADIUM AND THE CURE OF CANCER.†

By J. A. SHORTEN, B.A., M.B., B.Ch., M.R.C.P. (Lond.), MAJOR, I.M.S.

THE position of radium in the treatment of cancer is a question of absorbing interest, not only to the medical profession, but to the community at large. No method of treatment has ever been so beset with alternating hope and despair. No method has been so extolled by some and so damned by others. What are the causes of this lack of uniformity in result and wide divergence of opinion? During my recent visit to Europe, I was afforded the opportunity of examining some twenty "follow-up" cases of uterine cancer at St. Bartholmew's Hospital, and had the privilege of a visit to the Curie Fondation in Paris. I feel, therefore, that my views on the above subject may be of interest to the medical profession in India.

The announcement of the discovery of radium was made at the Académie de Sciences in Paris on the 26th December, 1898—about 28 years ago—in a joint paper by M. and Mme. Curie.

The first to discover the action of radium on human tissues was the late Henri Becquerel, who, having carried about in his pocket a small packet of radium, contracted and suffered for some months from a chronic ulcer of the adjacent skin.

This observation was duly confirmed by Pierre Curie, who deliberately produced the same result after an application of ten hours. It was then that M. Curie set himself to work to turn this apparently evil force to good account. Some radium was presented to a doctor of the St. Louis Hospital, and he used it with great care and moderate success in the treatment of certain skin diseases.

This was the beginning of radium therapy. Space prevents me from tracing further the development of this treatment up to the present day. The alternating hopes and disappointments are only too well-known to you all.

Before entering on the main subject of my paper, I will describe to you some personal experiences of treatment with radium. For some months I have had the use of a quantity of radium salt equivalent to 60 milligrammes of radium element. This is contained in 3 tubes of approximately 20 milligrammes each. With this I have treated some half dozen cases of cancer of the cervix uteri, a few cases of cancer of the pharynx, tongue and cheek, with varying success.

My first experience with radium however was in a case of rapidly growing carcinoma of the larynx. This patient in the absence of radium was treated first of all by *x*-rays. A standard Coolidge tube, backing up a 9-inch spark gap, was used. The rays were filtered through 5 millimetres of aluminum. He received in all about 680 milliampere-minutes at a skin distance of 9 inches in a month. The result was nothing short of dramatic. The ulcer in the larynx almost healed. A large secondary gland in the neck melted away as if by magic, and the patient returned to work. Then the radium arrived and in the course of 23 days he received to the interior of the larynx 600 radium element hours (screen: ½ mm. platinum and 1 mm. of rubber), and externally to either side 1,750 radium element hours through 4 mm. of lead. The result of this treatment (which was endorsed by the only authority on radium in India at the time) was intense necrosis of the mucous membrane of the larynx, with exfoliation of some of the cartileges.

* *Journ. Roy. Army Med. Corps,* August 1918, p. 161.

† Being a paper read at the meeting of the Medical Section of the Asiatic Society of Bengal on the 20th September, 1926.

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Tracheotomy was performed on the 30th May, and the patient died on the 11th June, three months after he had come under treatment.

I have dealt with this case in some detail, because it represents the usual history of such cases, viz., preliminary success, with final disaster.

Of the other cases of which I have notes, the following are the details:—

Carcinoma of the Cervix—five cases.

Case 1.—An advanced case with extension into the broad ligament and base of the bladder. There was continuous hæmorrhage for some months. She had in all 3,120 mgm. hours of radium element. The immediate effect was encouraging. Hæmorrhage entirely ceased. She returned 3 months later with marked cachexia, and considerable pain on vaginal examination, due to adhesive vaginitis. She died a month later.

Case 2.—An inoperable case, with continuous bleeding for 9 months, and a fungating growth of the cervix. She had 5,880 mgm. hours. Three months after treatment there was so sign of existing disease. At the end of 5 months the patient was still well.

Case 3.—This case was also an advanced one of carcinoma of the cervix uteri. There was a hard nodular mass occupying both lips of the cervix, and adherent to the vaginal wall on the left side. The opening of the cervical canal could not be located. This patient first received 60 mgms. radium element in 3 tubes screened 1 mm. silver and 1 mm. rubber, disposed around the cervix for 24 hours. After 10 days another 12 hours' exposure with the same amount of radium was given, and finally after 30 days it was possible to introduce 40 mgms. of radium element into the cervical canal, the total exposure being 3,280 mgm. hours. Seven weeks after the first exposure there was remarkable improvement. Ulceration had disappeared and the mass as felt per rectum was much smaller and softer. There was a moderate degree of adhesive vaginitis.

Cases 4 and 5.—Cases with extensive involvement of the vaginal wall. Treatment was undertaken for the alleviation of symptoms—hæmorrhage and pain. Both were much improved when last seen, about one month after treatment.

Sarcoma of the Cervix—one case.

This was a case of inoperable sarcoma of the cervix in a young woman of 30, referred to me by the Eden Hospital authorities, after histological examination. She received internally 2,640 mgm. hours radium element with the usual screening, and externally 2,160 mgm. hours. The growth disappeared completely, and she was discharged cured after about 2 months.

The technique followed in the above cases was as follows:—

Three tubes containing 60 mgms. radium element, with a total screening of 1 mm. silver and 1 mm. of rubber, were placed in the vagina and around the cervix for 24 hours; 2 tubes (40 mgms. radium element) were introduced into the cervix and uterine cavity for 24 hours, and 3 tubes (60 mgms. radium element), screened 1 mm. of silver, at a distance of 1 cm. from the skin were placed in the right and left iliac fossæ and in the midline above the pubis, for 12 hours in each place. The latter part of the treatment I now omit for reasons I will explain later.

Cancer of the Mouth, Tongue, and Larynx—seven cases, including one case of myeloid sarcoma of the upper jaw which had previously been successfully operated on.

The technique adopted in these cases was—

Three tubes, containing 20 mgms. radium element each, at 8 cm. from the skin externally for 12 hours; and about 40 to 60 mgms. radium element screened 1 mm. silver and 1 mm. rubber internally for about 6 hours. All these cases improved, temporarily at any rate, and the results were encouraging except in 2 cases, one of carcinoma of the cheek, which had about 3,000 mgm. hours in all but became steadily worse after temporary improvement, and a case of sarcoma of the neck which had external treatment only with great reduction in the size of the growth externally but extension internally after a month or two with paralysis of the vocal cord on that side.

During my recent visit to England, I saw 20 follow-up cases of carcinoma of the cervix with Dr. Malcolm Donaldson at St. Bartholomew's Hospital. These cases had been treated with 50 mgms. of radium element for 144 hours. The radium was applied in platinum needles ½ mm. thick, introduced into the substance of the growth. The series included 2 cases dating from 1921. In addition to these there were 6 cases apparently cured, including two of 2 and 3 years duration respectively. In two of the cured cases the radium had been introduced intraperitoneally as well as *per vaginam*.

There was one case which had been treated by deep *x*-ray therapy, but had a large recurrent mass in the right iliac fossa.

In all cases bleeding had stopped since the termination of the treatment, and there were only a couple of cases with any vaginal discharge at all. Practically all cases showed evidence of adhesive vaginitis. One patient complained of increased pain.

On the 1st July, 1926, I formed one of a party of 30 physicians and surgeons who paid a visit to the Fondation Curie in Paris. This institution being primarily a research institute, treats only selected cases of cancer of the uterus, tongue, cheek, and pharynx, and recently cancer of the rectum. Their idea is to treat only cases in which the results can be adequately checked.

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The principles on which the work is carried out are as follows:—

Cancer of the Cervix Uteri.

1. Only cases in which there is a definite hope of cure are treated. These are practically what the average surgeon would consider operable. No cases are treated for palliation.

2. Histological examination of the growth is first made in all cases, except in sarcoma when sections are made after moderate exposure to prevent the possibility of dissemination.

3. Filtered gamma rays are now used exclusively. All techniques involving the use of alpha and beta rays have been abandoned.

4. The main aim of treatment is to give the dose which will destroy the malignant cells without destroying the normal tissues.

5. When possible, the complete treatment is given at one sitting, to prevent sensitization of healthy cells or increase in the resistance of malignant cells.

6. Treatment of recurrence after radiation gives bad results and therefore is not usually undertaken.

The results obtained in cases of carcinoma of the cervix are shown in the accompanying tables, from which it will be seen that there is a steady improvement in the percentage of cures from 1919 to 1924, especially in the cases classed as operable. This improvement is to a certain extent due to more careful selection of cases, but also to improved methods of application.

Cancer of the Tongue.

In the case of cancer of the tongue the general principles are the same. The routine treatment adopted at present is, firstly, the introduction locally into the growth of platinum needles containing radium. The needles have walls 1 mm. thick; they are placed 1 to 2 cms. apart, and an average of 6 to 10 needles is used for each case. The radium in each needle is distributed in one or more foçi, each containing 1.25 mgms. radium element, and the total dose is expressed in mgm. hours as usual. The needles are allowed to remain *in situ* for varying times depending on the amount of radium employed. The average time would appear to be 6 to 8 days. If we take for example 6 needles containing one focus of 1.25 mgms. of radium element, and allow these to remain *in situ* for 8 days, we shall get a total dose of 1,440 mgm. hours.

If any of the cervical glands are enlarged, a block dissection of the neck is done, removing the sterno-mastoid muscle, jugular vein, and the whole chain of lymphatic glands *en bloc*. The glands are then examined microscopically, and, if malignant cells are found, the whole neck from the lower jaw to the clavicle is radiated with a flat applicator containing 1 to 2 mgms. radium element per square centimetre at a distance of two centimetres from the skin. Very frequently it is found that the enlarged glands are due to septic absorption and do not contain any carcinomatous cells. In such cases surface radiation is dispensed with.

The results obtained are shown in the accompanying Table II. During the two periods shown it will be seen that from 20 to 25 per cent. of cures may be expected. That percentage has since been improved on and now about 34 per cent. of cures is obtained.

TABLE I.

Carcinoma of Cervix.

	Number of cases.	Discharged cured.	Inoperable, cured.		Just operable, cured.	
1919	103	9·1%	69	4·7%	34	21·7%
1920	98	19·1%	51	15·2%	47	23·2%
1921	48	26·0%	19	15·7%	29	33·3%
1922	69	32·8%	42	22·8%	27	46·1%
1923	85	38·3%	47	22·7%	38	56·7%
1924	80	40·3%	53	25·0%	27	70·8%
Alive and well after	1919.	1920.	1921.	1922.	1923.	1924.
1 to 2 years	14·9%	24·9%	43·4%	37·7%	43·2%	40·2%
2 to 3 ,, ...	14·9%	21·3%	36·9%	34·4%	38·2%	
3 to 4 ,, ...	12·9%	20·2%	32·6%	32·8%		
4 to 5 ,, ...	9·1%	19·3%	26·0%			
5 to 6 ,, ...		Due to selection of cases.		Doubtful cases taken.		
6 to 7						

TABLE II.

Carcinoma of Tongue.

Year.	Cases	Died from other causes.	Not cured.	Complete cure (after 3 years).	Local cure.	Total benefited.
1920-21	88	5	44	20 to 22·7 %	19	39 to 44·3 %
1922-23	86	5	40	21 to 24·4%	20	41 to 46·5%

Apparent complete cures now up to 34 per cent.

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Attempts are now being made to treat cancer of the cheeks as well as malignant conditions of the face and neighbouring parts, with some success. In this connection a word of warning may be uttered. Cross-fire methods are still in vogue in some clinics, but in Paris it was found, in the case of cancer of the floor of the mouth, when with the intention of producing a cross-fire effect tubes of radium were placed on the floor of the mouth and externally on the skin at the same time, intense necrosis of the floor of the mouth resulted. This is due to the caustic effect of the characteristic rays produced from the metal enclosing the radium. Cross-fire therefore should be consecutive, not simultaneous.

From what has been written above it will be seen that the results of the treatment of cancer by radium are steadily improving. At the Fondation Curie clinic I saw 15 cases of cancer of the tongue, ranging in duration after treatment from 3 to 6 years, apparently cured. The gamma ray of radium has been proved to demonstration when applied in appropriate doses to be capable of destroying carcinomatous cells while it leaves the normal tissue cells comparatively unaffected. It may be asked "Why then can we not cure every case of cancer?" The answer is to be found in the law of inverse squares, which states that in all forms of radiation the intensity at a distance from the source varies inversely as the square of the distance. For instance, in the case of radium, the effect on a cell at a distance of 1 mm. is one thousand times that at a distance of 1 cm. This is a stupendous fact to face, and as inexorable as the law of gravitation. Practically it means this, if we place a tube of radium on the surface of a malignant mass for a time determined by the maximum dose the skin will bear, we shall destroy the malignant tissue up to a certain distance from the tube, while immediately beyond this the malignant cells will be stimulated for a certain distance, and still further away the effect will be nil. Bumm showed in the case of cancer of the cervix on post-mortem examination of cases treated by radium that the malignant cells are destroyed for a distance of 3 cms. only. The net result then is that by application of radium we have actually done more harm than good. Such is the effect of the radium diminution of intensity of radiation in accordance with the law of inverse squares.

Now there are two possible ways by which we may counteract the influence of the law of inverse squares. We can, for instance, aim at producing a uniform radiation throughout the whole mass of malignant tissue. Theoretically this may be done by distributing the radium in needles placed at appropriate distances from one another, so that all malignant cells lying between the needles receive a lethal dose. In practice, however, there are many insuperable difficulties. In the first place only a few tumours are accessible to treatment by this method, and we meet with the same difficulties as the surgeon who attempts to excise the growth, viz., we have no means of determining how far the growth has extended through lymphatic and other channels outside the tumour mass. For this reason we may reasonably assume that this method will never attain complete success, although, just as is the case with surgery, brilliant results may occasionally be obtained.

The second method depends on the fact that radiation such as light proceeding from a point becomes for all practical purposes a parallel beam at a distance of 6 metres. At that distance two points at a distance of 10 cms. would receive approximately the same amount of radiation, and therefore it should be possible to give the calculated lethal dose to all malignant tissue distributed throughout the thickness of the body. In between these limits it can be shown by a simple calculation, that by increasing the distance of the radium from the skin the total dose received at a fixed distance below the skin can be increased.

Thus I find that with 60 mgms. radium emanation I get an erythema of the skin at 1 cm. distance in 12 hours. And therefore if the radium is placed at a distance of 3 cms. from the skin the erythema dose according to the law of inverse squares will be 108 hours.

If we now consider the effect on a malignant cell 3 cms. below the skin, in the first instance we give it a dose of say x units per hour or a total of 12 x. In the second instance we shall give $16|36 = 4|9$ x per hour for 108 hours, which works out as a total dose of 48 x, or exactly 4 times as much. The same effect may of course be produced by quadrupling the amount of radium. The problem would therefore seem to resolve itself into the employment of a sufficient quantity of radium to enable one to use it at a sufficient distance to make the depth dose practically equal to the skin dose. The French have already realised the possibilities underlying this theory. They are now experimenting with an apparatus containing 4 gms. of radium. This is placed at a distance of 10 cms. from the skin, the rays are filtered through 1 mm. of platinum. Exposures vary from 60 to 70 hours. Remarkable results in carcinoma of the cervix, and carcinoma of the rectum are already claimed for this method, but as it is still in the experimental stage they have not been published.

It will be readily recognised that the modern tendency is to use the radium tube in the same way as the *x*-rays tube, and it is possible that if sufficient quantities of radium were available, radium therapy would replace deep *x*-ray therapy altogether. It is unlikely that *x*-ray apparatus capable of producing a

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ray of a wave length comparable to that of the gamma ray of radium will be produced in the near future. On the other hand, at the moment both agents possess certain specific advantages and it seems only reasonable that they should be considered complementary rather than antagonistic in the treatment of disease. For instance, in the treatment of cancer of the cervix uteri, it seems reasonable to conclude that the best form of treatment is the application of radium locally, with deep x-ray therapy to the pelvic glands and lymphatics.

Finally, I may record the opinion that radium is a double-edged sword, and if employed in insufficient quantities by inexperienced persons it is likely to do more harm than good.

SOME OBSERVATIONS ON THE ERUPTION OF TEETH.

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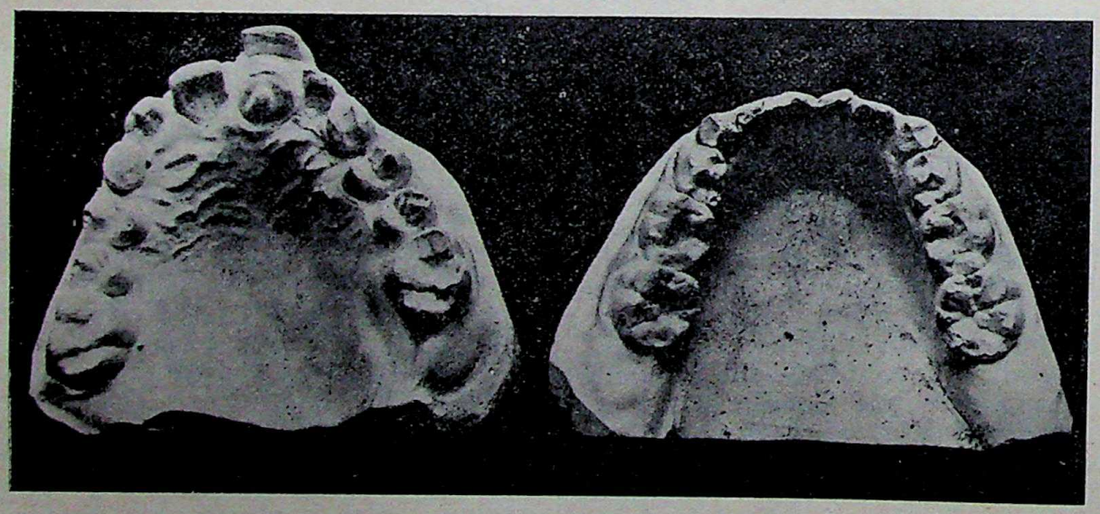
DETERMINATION of age in the living is a question of every day importance to the practitioner medico-legally, and the importance of teeth in its estimation is not inconsiderable. Of the two chief tests, i.e., the time of appearance of certain centres of ossification and the time of eruption of teeth, the latter is of greater service to the practitioner for he cannot always invoke the help of x-rays in determining the centres of ossification. There is no doubt that the time of ossification is a more reliable guide and helps us to determine the age up to 25 years, while teeth are of help only up to the age of 18, yet they are a more convenient guide. Beyond 25 the age determination is a matter of guesswork.

As the teeth are of such importance medico-legally, it may be of interest to record certain freaks of Nature against the general average time of their appearance. During the last year I have come across three such cases:—

Case 1.—I was consulted about a Hindu male child the next day after its birth regarding the pain it caused the mother in suckling. On examination the lower central incisor was seen coming out of gums. There was no history of any venereal disease in the parents.

Case 2.—A Hindu lady aged 32 who was wearing partial upper and lower dentures consulted me about the rest of her teeth. Certain of them were affected with pyorrhœa and were taken out by me. A fortnight after the extractions the patient began to complain of pain in the hind part of her gums. On examination it was found that the wisdom teeth were making their appearance. The gum on the tense spot was lanced. The teeth both in the upper and the lower jaws are now fully erupted and painless.

Case 3.—A Mahommedan male child, aged about 8 years, was brought to me for extraction of an upper front tooth which was situated on the inner side of the arch. The tooth on examination was found to be a misplaced permanent canine. On further careful examination the dentition was found to be peculiar inasmuch as that the upper jaw revealed all the premolars in place, thus indicating the age to be nearly 12 years, while the lower jaw showed all the temporary molars and canines in place, indicating the age to be about 8 years, which was corroborated by the parents and the general appearance of the child. Two plaster models were prepared by me from impressions taken in stent of the child's mouth. The photograph of the models is sent herewith.



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THE RESULT OF ARTIFICIAL PNEUMOTHORAX TREATMENT IN PULMONARY TUBERCULOSIS, WITH A SYNOPSIS OF 182 CASES.

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THOUGH the Hippocratic School seems to have practised artificial pneumothorax in pleurisy and other pulmonary conditions 2,000 years ago, the first application of this treatment by the modern method was by Forlanini of Pavia in 1894 and Murphy of Chicago in 1898. Pneumothorax therapy is now employed by physicians in most parts of the world with signal success.

The principle on which this treatment is based is the enforced rest given to the diseased lung by introducing air into the pleural cavity and collapsing the organ by equalizing the atmospheric pressure inside and outside the lung. The contraction of the lung tissue not only results in the ejection of the toxic contents of the cavities and the bronchial tubes, but prevents the further accumulation of these products and hastens the process of fibrosis and repair.

Different kinds of apparatus have been used by different workers but Lillingston and Pearson's apparatus which is the simplest and the best was used throughout in my work, the water manometer fitted to the apparatus being the indicator of the introduction of the needle into the pleural cavity. Morphia ($\frac{1}{4}$ gr.) with atropine (1|150 gr.) was injected before the initial operation and novocaine (2 per cent.) with adrenalin was invariably injected into the track of the pneumothorax needle about 3 minutes before puncture. Ordinary sterile, filtered atmospheric air was used for the inflations.

The usual difficulties and complications encountered by pneumothorax therapists all the world over were experienced. The operation failed completely in 15 per cent. of cases on account of continuous adhesions. In 61 per cent. of cases partial pneumothorax alone could be induced and in 24 per cent. a good pneumothorax was produced. The last includes cases where slight adhesions were present which did not prevent the collapse of the lung to a satisfactory extent. Thin bands of adhesions often gave way during the successive refills and rendered the collapse more complete. About 250 c.c. of air was introduced during the initial operation and increasing amounts during successive refills, the maximum quantity given at any time not exceeding 800 c.c. and usually not exceeding 500 c.c. The average Indian chest being smaller than the European, the latter quantity was found by experience to be the average maximum that the Indian chest could take in, whilst 700 to 800 c.c. could usually be put into a European patient. The intervals between the refills were slowly increased from 2 days to 3 weeks.

The usual accidents met with during pneumothorax treatment occurred in the series. Slight pleural shock, dyspnœa, and cardiac embarrassment were occasionally seen but did not interfere with the progress of the case. Pleural effusion resulted in 22 per cent. of cases but was not so large as to necessitate aspiration. Subcutaneous emphysema occurred in a number of cases but was of no consequence. Deep emphysema occurred in one case due to puncture of the lung but produced no serious consequences, the patient getting over the dyspnœa and dysphagia in 3 or 4 days, by the natural closing of the puncture and absorption of the air.

TABLE I.

Synopsis of 182 cases in which Artificial Pneumothorax was done or attempted.

	Good Pneumothorax.					Partial Pneumothorax.					Failures.				
	Arrested.	Much improved.	Improved.	No effect.	Total.	Arrested.	Much improved.	Improved.	No effect.	Total.	Arrested.	Much improved.	Improved.	No effect.	Total.
Stage I ..	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
Stage II ..	6 75 %	0	2 25 %	0	8	5 38 %	3 23 %	3 23 %	2 16 %	13	0	0	0	0	0
Stage III ..	7 33 %	8 38 %	3 14 %	3 14 %	21	16 14 %	18 16 %	33 29 %	45 41 %	112	0 0 %	5 18 %	11 41 %	11 41 %	27
Total ..	13 43 %	8 27 %	5 17 %	4 13 %	30	21 17 %	21 17 %	36 29 %	47 37 %	125	0 0 %	5 18 %	11 41 %	11 41 %	27

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TABLE II.

Result of Artificial Pneumothorax Treatment in Pulmonary Tuberculosis. Cases which took at least 3 months of treatment.

	Good Pneumothorax.					Partial Pneumothorax.				
	Arrested.	Much improved.	Improved.	No effect.	Total.	Arrested.	Much improved.	Improved.	No effect.	Total.
Stage I ..	0	0	0	1 100%	1	0	0	0	0	0
Stage II ..	6 86%	0	1 14%	0	7	5 55%	3 33%	1 12%	0	9
Stage III ..	7 35%	8 40%	3 15%	2 10%	20	16 28%	16 28%	13 23%	12 21%	57
Total ..	13 46%	8 29%	4 14%	3 11%	28	21 32%	19 29%	14 21%	12 18%	66

TABLE III.

Comparative results of Artificial Pneumothorax Treatment and of Ordinary Treatment in Stages II and III of Pulmonary Tuberculosis.

	Total cases.	Cases that benefited in Stage II.	Cases that benefited in Stage III.	Cases in which T.B. disappeared from sputum.
Pneumothorax treatment.	93	100 %	82 %	53 %
Ordinary treatment.	344	77·8 %	30·5 %	17·4 %

The results of pneumothorax treatment in the series are given in the above tables. Ordinary medicinal and sanatorium methods were used in addition to the collapse therapy, but a comparison with an analysis of 344 cases treated in the hospital during 3 years without pneumothorax brings out the comparative value of this form of treatment. The series was constituted of cases in the more advanced stages of pulmonary tuberculosis from all parts of India. It will be seen that whereas 22 per cent. of cases were arrested in Stages II and III by pneumothorax treatment, only 14 per cent. of cases obtained the same benefit by ordinary treatment and whilst a total of 100 per cent. and 82 per cent. of cases benefited in Stages II and III respectively by pneumothorax, 77.8 per cent. and 30.5 per cent. only benefited by ordinary treatment: 53 per cent. cases became bacillus negative by pneumothorax treatment, as contrasted with 17.4 per cent. by ordinary treatment.

The progress of the disease was remarkably affected by the successive inflations. High temperatures which had resisted weeks and months of ordinary treatment came down to normal or nearly so in a few days or weeks and the sputum became bacillus negative in a remarkably short time, often in 3 to 5 weeks. The effect produced was indeed dramatic in some cases and the treatment became so widely popular that every patient began to ask for it.

There is usually a slight fall in weight during the preliminary stages of artificial pneumothorax therapy, which has been variously put down to displacement of the mediastinum and pressure on the liver and stomach, but the patients soon regain this lost weight and put on further flesh and strength in the later stages of the treatment.

Pneumothorax therapy is applicable to about 5 per cent. only of all cases. There is no object in applying the treatment to the early cases in Stage I, as ordinary treatment suffices for these, but in such of these early cases in which ordinary treatment fails to do good in about 3 months, artificial pneumothorax should be employed. Unilateral cases, cases with less than one-third of the opposite lung implicated, cases of severe hæmoptysis, pulmonary abscess, bronchiectasis, etc., come under the category of suitable cases, but extensive bilateral involvement, advanced diabetes, cardiac and renal complications and peritonitis and intestinal ulceration contraindicate the employment of pneumothorax therapy. Different workers have employed different standards in the choice of cases, but generally speaking whilst unilateral cases free from pleural adhesions give the best results, bilateral cases even of an advanced type show greater or less improvement, if not actual arrest. In fact whilst an apparent cure results when the opposite lung is comparatively healthy, an amelioration is invariably effected even when there is advanced implication of the less diseased lung. Above all,

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collapse therapy by rendering the sputum bacillus-negative, or reducing the number of bacilli, considerably curtails the chances of spread of infection. The drawback to the treatment is that *x*-ray examination of the cases has to be conducted before and during the course of the inflations. Unless the condition of the collapsed and the healthier lung is closely watched by skiagrams or by fluoroscopy one might be startled by some disastrous results. Deep seated disease in the opposite lung not detected by physical examination might spread and give disappointing results, or a superficial cavity in the lung to be collapsed might get punctured by the pneumothorax needle and produce the disastrous consequences of pulmonary rupture.

One great advantage of the treatment is that it can be conducted in the midst of busy towns and cities with results that compare favourably with those obtained in sanatoria in salubrious climates by the same treatment. The patient will be living all the time under conditions not very different from those of his domestic surroundings and can adapt himself to his home conditions immediately on the cessation of the treatment.

AN APPARENTLY INFECTIOUS OUTBREAK OF THE EPIDEMIC DROPSY FORM OF BERIBERI.

By I. R. ANDERSON, M.B., Ch.B.,
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ON 27th July, 1926, J. M. and his family, suffering from epidemic dropsy, came to live at Kalna where, up to that time, there had not been any signs of the disease. They lived in the house of Mrs. M, at "A" in the map for two days, and then went to live with Mrs. K at "B" in the map. On 2nd August S., a servant of J. M., came to Kalna. He was also suffering from epidemic dropsy and was admitted to hospital. He spent a great deal of his time with B. M. at "C" in the map. Meanwhile, on 1st August, Mrs. M developed the signs and symptoms of epidemic dropsy. On 9th August Mrs. K. also developed epidemic dropsy, and B. M. on 12th August. Thereafter, during the following month, numerous other cases of epidemic dropsy occurred locally, the last case developing on the 7th September.

The outbreak occurred amongst the Mission workers living at Kalna. The Mission hospital is situated about one mile from the centre of the town, and round about it there are living those who work in the hospital, i.e., doctors, compounders and nurses, and also several teachers—both male and female—who teach in the Mission Schools. In addition to these, there are also several menial servants living in the compound.

Imported Cases.—Unfortunately accurate records were not taken of the five "imported cases." There is no doubt, however, that they were all suffering from the disease which was at the time so prevalent in Calcutta and other districts. The infected persons came from Gosaba, in the Sunderbans, where the disease was widespread. The following table illustrates the severity of the disease in each case and the relationship of the cases to one another:—

TABLE I.

Imported Cases.

Case No.	Age.	Sex.	Oedema.	Diarrhœa.	Fever.	Dyspnœa.	Pain on pressure.	Knee reflex.
1	J. M. 35	M	++++	++	+	+++	+++	?
2	J. M.'s wife 34	F	+++	++	+	+++	++	?
3	J. M.'s child 2	F	+++	+	+	++	?	?
4	J. M.'s nephew 5	M	++	—	—	—	—	+
5	S—servant 15	M	++++	++	+	+++	++	—

Some of the details of the signs and symptoms of the disease were as follows:—

(1) *Fever.*—Intermittent low fever, the temperature rising to 99° or 100°. The fever did not yield to quinine. Case No. 5, who was under observation in hospital, had fever for about forty days.

(2) *Oedema.*—A continuous firm œdema of the feet and legs, and a transient œdema of the face and hands, that of the face being marked in the morning.

(3) *Dyspnœa.*—There was marked breathlessness both on exertion and at rest.

(4) *Gastro-Intestinal Symptoms.*—Seven or eight loose motions daily. No vomiting. Loss of appetite.

(5) *Pain.*—Pain in the calves of the legs on pressure was marked. In some cases there was a continuous pain. There was also marked muscular weakness.

(6) *Knee Reflex.*—Examined only in two cases.

(7) *Urine.*—Albumen free.

Local Cases.—In all, eighteen cases of the disease occurred locally. On the whole the disease in these cases was of a slightly milder nature, with the exception of case No. 1 who was acutely ill. The severity of the disease was less in the cases occurring late, the

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disease in the last five cases being of a very mild type. Table II gives details of the signs and symptoms in each case; while Table III shows the relationship of case to case.

TABLE II.

Local Cases.

Case No.	Oedema.	Diarrhœa.	Fever.	Dyspnœa.	Pain on pressure.	Delayed second cardiac sound.	Knee reflex.
1	++++	+++	+	+++	+++	+	++
2	++	+++	+	++	—	+	+
3	+++	+++	—	++	—	—	—
4	++	—	—	++	++	—	+
5	++	—	—	+	—	—	—
6	+++	—	—	+++	—	—	—
7	+++	+++	—	+++	++	+	+
8	+++	—	+	+++	++	+	—
9	++	++	—	+++	++	?	?
10	+++	++	—	+++	++	+	—
11	+++	—	—	+++	+++	+	—
12	+++	—	—	+++	—	—	—
13	+++	++	—	+++	++	+	—
14	++	++	—	+	—	—	—
15	++	—	—	++	+	—	+
16	++	—	—	+	—	—	+
17	++	—	—	++	++	—	—
18	++	—	—	++	—	—	+

Additional observations are:—

(1) Fever was recorded only in three cases. The fever of Case No. 2 appears to have been malaria.

(2) Oedema was the special feature of every case, the first to appear and the last to disappear.

(3) Knee reflexes varied, sometimes being quite absent but normal a few days later, and vice versa. Absence of reflexes is recorded in all cases in which it was found at any time.

(4) The urine was in all cases albumen free.

(5) A delayed second cardiac sound was observed in a number of cases. Some cases complained of palpitation.

Course of the Disease.—The disease was not a disabling one. Several cases were confined to bed for a few days, but the majority recovered in three weeks without any change in diet.

Case No. 1 was the most serious. In spite of three weeks holiday in September, she returned to Kalna on account of her illness. Latterly she had blurring of the vision, due probably to a toxic paresis of the iris muscle. She ultimately recovered on 14th October.

Treatment.—Very few cases required treatment, the disease being accepted by the people as one which got better of itself. Four of the cases required to be admitted to hospital. With absolute rest, daily injections of adrenalin, and a mixture containing digitalis and iodides, they made a slow recovery.

Case No. 9. This case requires special comment as she died suddenly while suffering from beriberi. On 2nd September, 1926, at 5 p.m. she complained of palpitation, and an assistant, finding her heart very fast, prescribed a sedative mixture. She did not complain of beriberi then. Till 9 p.m. she was well and then went to bed. I was called at 1-30 a.m. and arrived to find that she had just died. Before her death she had vomited twice and she had had increasing difficulty in respiration. Previously she had been a healthy girl of nineteen, and there was no apparent reason why she should thus die suddenly. On investigation it was found that she had been suffering from beriberi for about fifteen days. From the description of those who were with her before her death we are inclined to think that she died from œdema of the lungs. Post-mortem examination was not made, but the froth at the mouth and nose at the time of death, and a continual watery discharge from the nose and mouth till she was buried twelve hours later, also suggest œdema of the lungs as the cause of death.

Rice Supply.—We made a careful investigation of the rice supply. The map illustrates the area in which the Mission compound is situated. There is one shop in this area, and from it most of the people living in the Mission compound and round about obtain their rice. The majority of the customers buy small quantities of rice at a time. Some eat milled rice only, some home-prepared rice, while others, who are not particular, sometimes eat one and sometimes the other. The whole stock of rice kept in the shop is five or six bags and this is sold out in about ten days; the stock being renewed about every tenth day. All this rice is bought locally from

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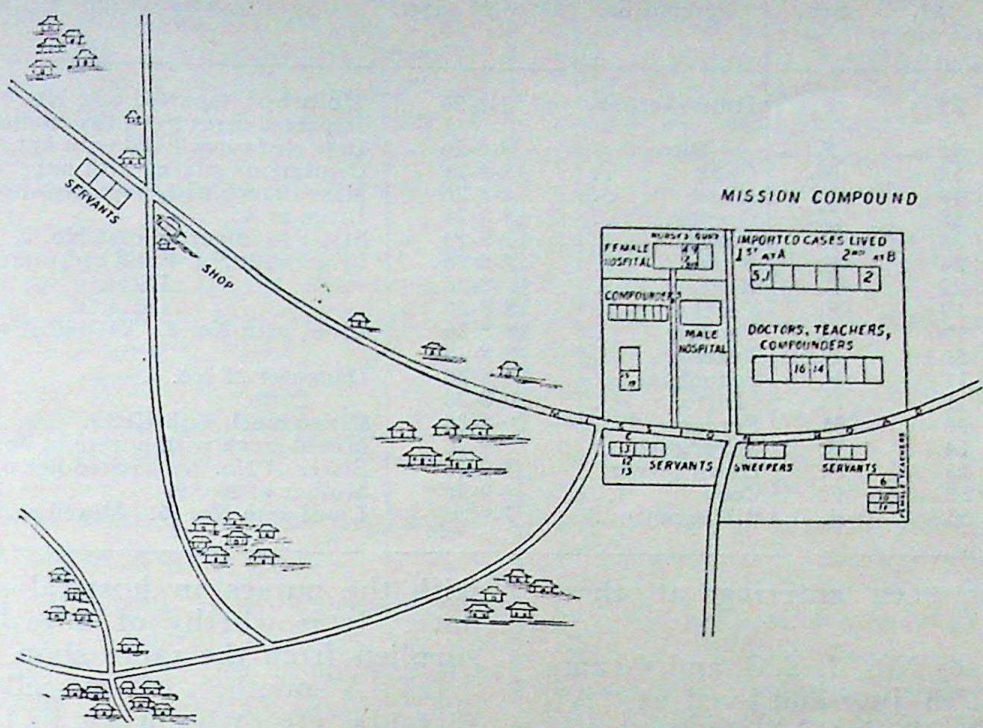
the rice merchants in Kalna. Throughout Kalna are numerous other such shops, all drawing their rice supply from the same sources.



Discussion.—This outbreak occurred exclusively amongst the Mission workers at Kalna. It was a small outbreak relatively and, on this account, detailed observations could be made.

In view of the fact that the theory of infected rice as the cause of epidemic dropsy holds the field at the present time, we naturally made a careful investigation of the rice supply in order to see if it had any connection with the incidence of the disease, and if so, what factors there were which limited the size of the epidemic. Obviously, there was no widespread infection of rice in this district, as no cases except those reported were sent to us or heard of at the time. In the town of Kalna itself (population 8,000) not a single case occurred. On the 6th September, three cases of epidemic dropsy came from a village sixteen miles away in district Nadia. They reported that there was an outbreak there. The people of Kalna buy their rice from small shops which, in turn, buy rice from the rice merchants in Kalna, that is from the same source as the rice supplied to the Mission workers at Kalna.

One might presume that only a limited amount of rice was infected and, being bought by some of the Mission workers, the disease occurred amongst them. In this outbreak, there were persons of nine households who developed epidemic dropsy. These nine households all bought their rice from the one shop. The same shop supplied rice to sixty households altogether; of these thirty are within the Mission and thirty outside, but close to the Mission. On investigation, we found that there was no period in July and August when only infected persons bought rice. Some of those who suffered from the disease were supplied only with home-prepared rice, some with milled rice, and some with both. Of those who were not affected the same facts can be recorded. We see, therefore, that there was no general infection of the rice sold at the shop.

Again, one may presume that only one bag of rice was affected and by some unlucky chance this rice was supplied to the Mission customers. Our investigations prove however that this was not possible, as there was no period during which these nine households alone were supplied in close succession. This supposition is also disproved by two other facts: (1) the rice supply lasted for ten days, yet fresh cases occurred long after that rice supply should have all been sold; (2) case No. 18 had been on holiday and arrived on Kalna on 4th September. She developed the disease on 7th September. The rice supply of this household had been renewed but a few days previously. This investigation effectively disposes of the theory of infected rice as being the cause of the disease in this outbreak. We failed to find any connection between the rice supply and the incidence of the disease. Our observations tend rather to disprove this theory.

The really striking points about this outbreak are these two facts: (1) that the outbreak occurred within a few days of the arrival in Kalna of people suffering from the disease, and (2) that there are definite indications of a person-to-person infection through the whole series of cases. (*See* Table III.)

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TABLE III.

House-hold.	Case No.	Age.	Sex.	Occupation.	Date of onset.	Relationship to other cases.
A.	1	21	F.	Housekeeper	1-8-26	Mother of imported case No. 4. Imported cases lived two nights at A.
B.	2	42	F.	Ditto.	9-8-26	Imported cases lived with her at B.
C.	3	50	M.	Cook ..	12-8-26	Continuous mixing with imported case No. 5.
D.	4	40	F.	Nurse ..	12-8-26	Mixed much with imported cases and with No. 1.
A.	5	28	M.	Doctor ..	15-8-26	Lived at A.
E.	6	23	F.	Teacher ..	15-8-26	Sister of imported case No. 1. Visited A often
D.	7	24	F.	Nurse ..	17-8-26	Lived with No. 4 and had same relationships.
D.	8	22	F.	Nurse ..	17-8-26	Ditto.
F.	9	19	F.	Teacher ..	18-8-26	Ditto.
E.	10	19	F.	Teacher ..	18-8-26	Lived with No. 6. Visited A often.
E.	11	21	F.	Teacher ..	18-8-26	Ditto.
C.	12	11	F.	Schoolgirl ..	18-8-26	Daughter of No. 3.
C.	13	8	F.	Ditto. ..	20-8-26	Ditto.
G.	14	28	M.	Servant ..	20-8-26	Mixed much with No. 3.
H.	15	14	F.	Schoolgirl ..	1-9-26	Mixed much with nurses in hospital.
I.	16	25	F.	Housekeeper	1-9-26	Sister of No. 9. Visited her often.
F.	17	55	F.	Cook ..	4-9-26	Mother of No. 9.
H.	18	55	F.	Biblewoman..	7-9-26	Lived with No. 15. Mixed with nurses much.

The infection is seen entering at three points:—

I. Imported cases Nos. 1, 2, 3 and 4 came to Kalna on the 27th July and lived at "A" for two nights. On the 1st August local case No. 1, living at "A," developed signs of beriberi.

II. On the 29th July imported cases Nos. 1, 2 and 3 went to live at "B." On the 9th August local case No. 2 occurred at "B."

III. On the 2nd August imported case No. 5 arrived in Kalna and was admitted to hospital. He spent a great deal of his time with local case No. 3, who developed beriberi on 12th August.

From these three points of entry we can trace two lines of person-to-person infection amongst the people infected:

1. Cases Nos. 1 and 2 were both females and from them the disease is seen spreading through the women in the Mission compound. Not all the women in the compound were affected—only those who mixed much with infected cases. In this line of infection is found one male, case No. 5, who was living at "A." He was away for the two nights when the imported cases lived at "A," but imported case No. 1 occupied his bed for these two nights.

2. Case No. 3 developed the disease on 12th August. His two daughters Nos. 12 and 13 developed it on 18th and 20th August respectively, and then case No. 14, with whom there was contact, also on 20th August.

A great deal could be written about the contact of case with case. A study of Table III and the map however will show how the cases were connected.

More important is it to point out how, when there was no close contact with infected people, cases did not occur:

(*a*) The sweepers were separate—no beriberi.

(*b*) One female nurse did not have beriberi. She lives at her father's house—not with the nurses in hospital—and comes for duty. It is worthy of note that her rice is supplied from the same shop.

(*c*) A number of miscellaneous people, servants, etc., who work in the Mission but live outside did not develop the disease.

(*d*) Male teachers and compounders did not develop the disease. They had no contact with the women nor with the other line of cases. Case No. 3 however cooked for several of them, but there was no contact between him and those for whom he cooked, as he placed the food on dishes with a ladle after cooking it.

On the other hand there were a number of persons whom we would have expected to have become infected with the disease but who did not become infected. We record below under the different cases instances of people who were in close contact with cases, but did not develop epidemic dropsy.

Case No. 1. Her husband and daughter did not develop the disease. The former was himself a patient in hospital for the first month of the two and a half months of his wife's illness, but she visited him often.

Cases Nos. 3, 12 and 13. The wife of case No. 3 and mother of cases Nos. 12 and 13 did not contract the disease.

Case No. 14. The wife of this case was not infected.

Cases Nos. 15 and 18. A Biblewoman who lived with these cases remained free of the disease.

Case No. 16. Her husband did not develop the disease.

Imported case No. 3. A compounder was a special friend of this case but remained free of the disease.

SUMMARY.

The article describes a small localised outbreak of epidemic dropsy which has several striking features:

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(1) The outbreak occurred in a place where previously there had been no sign of the disease.

(2) It followed immediately on the arrival of people suffering from epidemic dropsy.

(3) There was no apparent connection between the rice supply and the incidence of the disease.

(4) There was evidence of a person-to-person infection.

(5) Instances of non-occurrence of the disease where it might have been expected to occur, if it were infectious are recorded.

TWO FORMS OF INFECTION OF THE KIDNEY.

By SIR JAMES R. ROBERTS, C.I.E., M.B., M.S., F.R.C.S. (Eng.), I.M.S. (Retd.).

Staphylococcal Infection and Perinephritic Abscess.—This has a direct relation to an attack of *boils*, and is an infarct of the cortical portion of a lobule or adjacent lobules and does not affect the apical portion. The immediate portion of the lobule under the capsule becomes the seat of a small abscess which burrows into the perinephritic tissue, and a large abscess results. This then is the most common cause of perinephritic abscess: less common causes are stone and guinea-worm, but these are more chronic in their development. This staphylococcal abscess is not necessarily associated with pus and blood in the urine, as it is likely to be shut off from the rest of the renal tissue. We see many cases of abscess in the cellular planes of the body following boils, and this infection of the cortex of the kidney is another example. The symptoms are rigors and fever of an acute type with pain in the loin, and subsequently a large swelling or tumour to be felt in the loin. It is important to diagnose the condition in an early stage remembering its association with boils and to open the abscess early, before too serious injury has been produced and before the general health is gravely involved. Pressure upon the lumbar plexus produces pain in more distant parts and adds some obscurity; hence it is well to remember this point. *Treatment* by incision and drainage requires no special description.

Bacillus Coli Infection.—There are two forms, the acute and the subacute, which latter passes into a chronic infection. The *acute* is rare, in fact very rare. It is an intense infection of one kidney with hæmorrhagic infarcts and general congestion and inflammatory œdema of the kidney tissue. This gives rise to marked hæmaturia. The important aspect of such a case is the sudden onset with rigors and the patient is brought from normal health in a few hours or a day to a condition bordering on death. The collapse is intense; the fever is high; vomiting is present; with great pain in the loin: enlargement of the kidney is to be felt unless the patient is obese, and there is the hæmaturia to guide in the diagnosis.

How is this acute condition to be dealt with? Either by the treatment given to a subacute case in the hope that the patient may be tided over the crisis and the acute inflammation of the kidney subside to a chronic one, or *immediate excision* of the kidney has to be most seriously considered, in spite of the collapse, as there is not much time available before the patient succumbs. However, these cases are so rare that a practitioner of long experience may never meet with such a condition.

Subacute Bacillus coli *Infection.*—Here again one kidney is attacked. The onset of the subacute type is fairly rapid, is apt to follow exposure to cold; rigors and fever are marked, with pain and tenderness in one loin, and the hæmaturia at once directs the attention to a kidney condition. In fact it is one of the more common causes of hæmaturia of the kidney type. Nausea and vomiting are present with the usual symptoms of severe illness on tongue, bowels, appetite, etc. An examination of the urine for *Bacillus coli* will give further information and decide the diagnosis. The infection attacks the apical portions of the lobules and the pelvis of the kidney, and not the cortex.

The recognition of this infection, in order that the treatment shall prevent the disease becoming chronic and intractable, is most important, as in this subacute condition treatment is successful, except perhaps in those past middle life. The essence of the treatment is to produce alkalinity of the urine as quickly as possible by large doses of citrate of potash, one drachm every four hours or every three hours, and the testing of each portion of urine passed with litmus paper so that when alkalinity has been obtained the doses of citrate of potash can be reduced sufficiently to maintain this condition. We all know that the *Bacillus coli* does not grow in alkaline media. Hot fomentations to the loin must be assiduously applied and the bowels evacuated at once by castor oil if the nausea or vomiting will allow of this; if not by calomel and salines. A most important point is that the patient must remain in bed for three weeks at least with continuous treatment, otherwise the infection will become chronic. One may say that had all cases been treated in the early stage, we should see few chronic ones. Rest is most essential. Naturally a bland diet has to be ordered, as in all cases of nephritis.

Chronic Bacillus coli *Infection.* This condition is so common in India and is the cause of the wrecking of so many important lives that it is time we should be able to effect a cure with the advance of medical science.

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Subacute or mild cases are of very frequent occurrence in children, but the resilience of the tissues of the young is such that Nature effects a cure with or without special treatment. In cases of febrile disturbances in children it is as well to bear *Bacillus coli* infection in mind and to remember the connection between the *coli* group and the typhoid group both of which infect the urine, which really means the kidney. The subacute infection passes into the chronic by recovery of the kidney tissue, but the continued infection in the pelvis remains and subsequent bladder irritability in some cases occurs. With this condition of pelvis infection relapses accompanied by fever, hæmaturia, etc., are common enough, even passing to a fatal issue. It is remarkable, however, that chronic pelvic infection may go on for years with few if any symptoms or only those of temporary derangements, the general health being in some affected, in others not at all. It is fortunate that the pelvis of the kidney is the residual focus and not the kidney tissue, otherwise the measures advocated below would have no chance of success. I have often thought that it was *Bacillus coli* infection which is the initial cause of stone in children of the tender ages of two, three and four.

Whether the *Bacillus coli* infecting the kidney is one of the human varieties or not is a question requiring investigation, or whether there is an extraneous and animal source. If it were human everyone should become infected: if its source is the cow the result would be similar. Is it the dog or what? Is there a scale of these bacilli with the typhoids at one end, and human *coli* at the other? The varieties of *B. coli* are numerous; some pathogenic to man, others not.

In the treatment of chronic *B. coli* infection of the kidney, urinary antiseptics by the mouth have failed or only ameliorate, vaccines have conspicuously failed, though temporary improvement has resulted. I have known cases of heavy infection only kept going by doses of vaccine from time to time. It is no use injecting the bladder with antiseptics as the disease is not located there.

Now comes an important advance; it is the pelvis of the kidney that requires to be injected and washed through a ureteral catheter and this must become the universal practice. There is no reason why a hospital surgeon in India should not become expert in the use of the cystoscope, the introduction of ureteral catheters, and lavage of the pelvis of the kidney. It is a question of apparatus, with its syringe, and a textbook on genito-urinary surgery: the material to practise on is in abundance. Anæsthesia is however essential.

The question of the antiseptic to be used for this lavage has to be considered. At present those practising it are in favour of silver salts,—silver having an old established reputation in genito-urinary surgery. There is nitrate of silver; collosol silver; argyrol; protargol, etc.; there is flavine 1 in 5,000; boric acid; carbolates; alkalies; the mercury salts; in fact this portion of the technique can be worked out by each practitioner according to his tastes. The essential point however is to use such as effect a cure in from 4 to 6 washings of the pelvis of the kidney. If it does not it is valueless. At last it appears that there is hope, the cure of these cases is at hand; treatment so far has been a sad failure and a patient with chronic infection of the pelvis of kidney has never been certain of his future. Where some stricture of the ureter exists relapses are likely to occur, and, further, cases of floating kidney with kinking of the ureter must undergo an operation for replacement before cure by lavage can become effective.

THE CONTROL OF KALA-AZAR ON TEA ESTATES.

By L. EVERARD NAPIER, M.R.C.S., L.R.C.P. (Lond.),
Kala-azar Research Worker, Calcutta School of Tropical Medicine;
and
PERCY FOSTER, M.R.C.S., L.R.C.P. (Lond.),
Badlipar, Assam.

PROPHYLACTIC measures that have been adopted with any success are:

(*a*) Segregation of sick and contacts.

(*b*) Transfer of the whole population to a new site.

(*c*) Intensive treatment.

(*a*) This measure aims at the removal of the source of infection. The failure is partly due to the fact that the early stages of the disease are very difficult to recognise and partly to the fact that the patient has every encouragement to conceal his symptoms if his failure to do this will mean the expulsion of himself and his family from his home.

(*b*) This measure is aimed at the removal of the population from the site wherein lies the agency that transmits the infecting organism from man to man. The hope of success is dependent on the assumption that the transmitting agency will not be transferred with the population and will not readily establish itself in a new site; the infecting cycle will thus be broken. The apparent failure of this measure is due to the fact that it is frequently many months, in some cases more than a year, after infection takes place before the first symptoms of the disease are apparent, so that persons who appeared to be infected on the new site were really infected on the old one. The actual failure of this measure is due to the fact that both recognised and unrecognised cases may linger on

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for so long that in the meanwhile the conditions in the new site become suitable for transmission to occur again and the broken cycle is mended.

(*c*) This measure also aims at the removal of all source of infection. It is dependent on the assumption, probably a sound one, that a person placed under proper treatment ceases to be infectious. Its failure is dependent on the fact that it only leads to the removal of a part of the source of infection, namely, the clinically obvious cases, and leaves untouched the unrecognised cases; it is inferior in this way to segregation which removes also the contacts amongst whom the largest number of unrecognised and early cases are likely to be found. Its partial success in practice is dependent on the fact that the promise of treatment will lead to the discovery of the early cases which the threat of segregation would fail to bring to light.

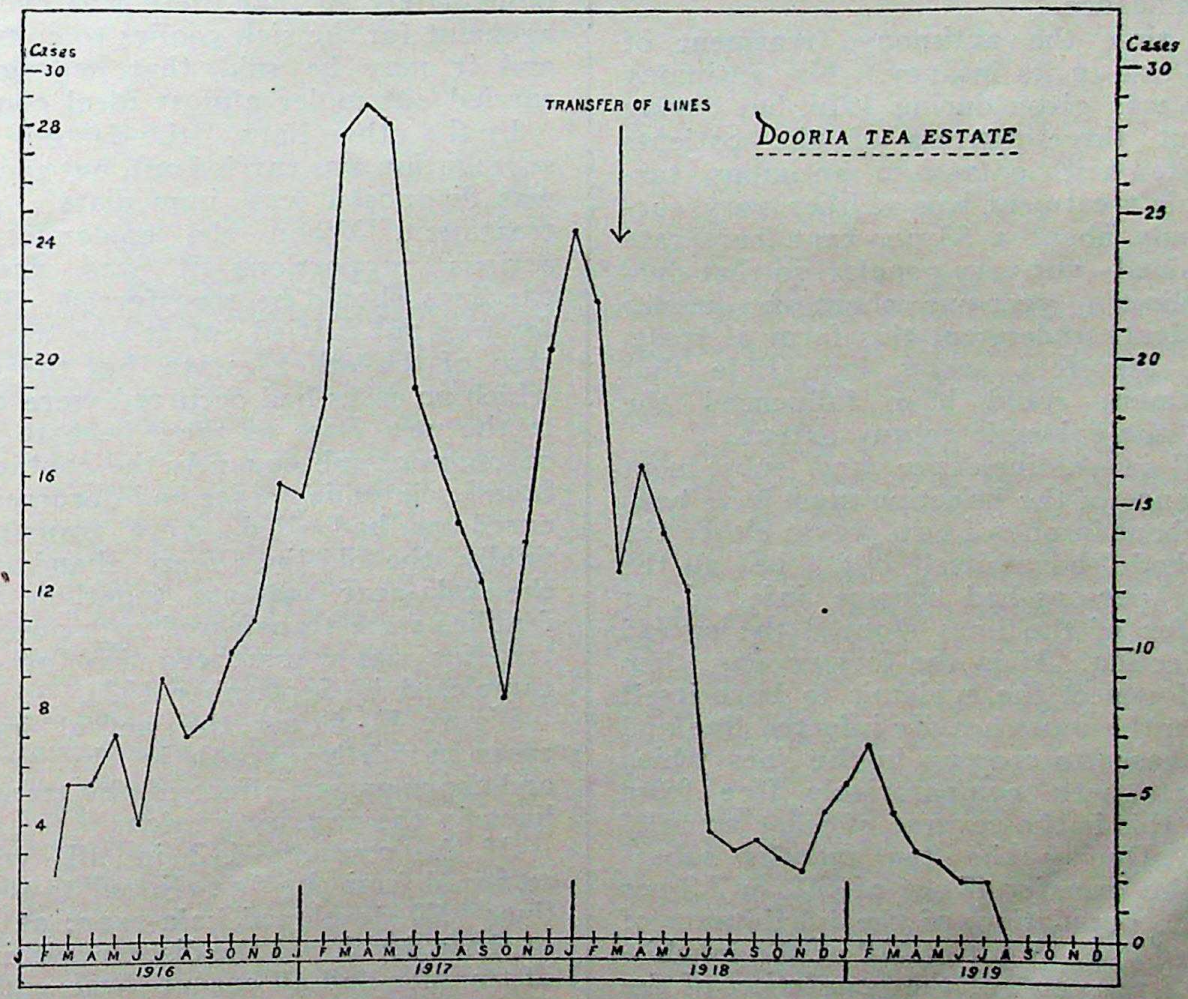
In the days prior to the introduction of antimony in the treatment of kala-azar measures (*a*) and (*b*) were given a very thorough trial; those who had an opportunity of observing the effects of these measures, Rogers (1899), McCombie Young (1924) and others, were unanimously of the opinion that the former was of little value, but that the latter, though more difficult and expensive to carry out, could be relied upon to control an epidemic in a village or tea garden coolie force.

Since the introduction of antimony in the treatment of the disease and more especially since the introduction of the more successful pentavalent compounds, it becomes necessary to re-examine the whole position with regard to the preventive measures to be adopted in a community into which the infection has been introduced.

Dooria.

One of the writers (P. F.) working in the Golaghat district in Assam has had the opportunity of seeing the disease occurring in epidemic form in a number of tea gardens under his charge. In one garden, Dooria, cases of the disease were first observed in 1916; within 2 years 350 persons, or 20 per cent. of the original coolie force, became infected and as little was known of the antimony treatment in those days more than half of these died. It was some time before the gravity of the situation could be impressed upon those who held the purse-strings and even then new lines had to be built, so that it was some considerable time before a transfer could be effected; this actually occurred in March 1918. The effect of the transfer is seen in the accompanying graph—Figure I—which is based the case incidence month by month.

FIGURE I.



The transferred coolies were arranged into three groups:—

A. The infected line, i.e., households in which there was a definite case of kala-azar.

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B. The contact line, i.e., households in which there was a suspected case of kala-azar, or had recently been a case.

C. The uninfected line, i.e., households from which no case of kala-azar had been reported.

It will be seen from the graph that there was a very marked falling off in incidence from the time of the transfer of the lines. Experience has shown that the highest point in the onset curve occurs in the cold weather months, November to February. On this tea estate in 1917, the largest number of cases were "listed" in the months of March, April and May. In the following year, as both the medical staff and the coolies themselves were more familiar with the disease, it is natural that earlier diagnosis would be the rule; it is therefore not surprising to find that the largest number of cases were "listed" in January in 1918. The fall in the incidence during the few months following the transfer is not a matter of much importance, but the failure of the incidence curve to rise to any height comparable to that of the two previous rises during the next cold weather and the garden's subsequent complete freedom from infection are points of great significance.

At this time the antimony treatment of kala-azar was in its infancy. No antimony treatment was given during 1916, but during 1917 about three-quarters of the patients were treated with potassium antimony tartrate. This treatment was neither very successful—only about a 33 per cent. cure rate being attained—nor very popular, so that during the following year only about one quarter of the patients underwent this form of treatment. It therefore seems impossible that the treatment could have influenced the course of the epidemic to any extent.

The fall in the incidence and subsequent disappearance of the infection must have been brought about in one of two ways; either the epidemic had "burnt itself out," i.e., all the susceptible persons had become infected, or the transfer of the lines stopped the spread of the infection. If in the former way, then we should expect the epidemic to burn itself out first in the most heavily infected line and the fresh cases to crop up in the lines which had hitherto been comparatively free from infection; this is the reverse of what actually happened. During the ten months subsequent to the transfer 47 out of 642, or 7.3 per cent. of the population, of the inhabitants of the infected line, 15 out of 310 of the inhabitants, or 4.8 per cent. of the population of the contact line, and 8 out of 345 of the inhabitants, or 2.3 per cent. of the population, of the uninfected line became ill with kala-azar. On the other hand there is considerable support for the suggestion that the transfer stopped the infection of more persons: 36 of the 47 cases in the infected line occurred within 3 months of the transfer of the lines; in these cases the infection certainly occurred previous to the transfer. It is known that the incubation period may be more than a year in certain instances, it is therefore quite possible that all the patients showing symptoms subsequent to the transfer were actually infected previous to the transfer.

One is driven to the conclusion that the almost dramatic cutting short of the epidemic was due to the transfer of the lines.

Hautley.

On another tea estate which had been apparently free from the disease prior to this date a number of cases were diagnosed in 1921; on this estate the coolies were living in two sets of lines, the "factory lines" and the "out lines." Different measures were adopted in dealing with the disease in the two sets of lines. In the "out lines" segregation measures were adopted; as each case was diagnosed the patient and the whole household were removed to the "factory lines." At this time treatment with sodium antimony tartrate was giving very satisfactory results; all the cases were placed under treatment immediately so that there was every encouragement for the sick coolies to come forward, and it may be said that segregation was carried out under almost ideal conditions.

In the other lines, "the factory lines," no segregation was carried out, but each case that was diagnosed was immediately put under treatment. When the epidemic developed serious proportions it was decided that the lines should be transferred. This transfer was not carried out at one time, as in the case of the other estate, but the families in which no cases had occurred were transferred to the new lines as they became ready for occupation; subsequently the contacts, i.e., the families in which cases had occurred but were cured or had died, were transferred; and finally, the old lines were abandoned and all the kala-azar patients together with their families were transferred to a new line. The transfer was commenced in July 1922 and completed in September 1923.

Figure II shows the actual incidence of cases month by month in the two gardens and the apparent effect of the transfer of the lines in the factory garden.

Of the contacts, 142 in all, which were removed from the "out lines" to the "factory lines" 29 developed kala-azar; as two-thirds of these developed the disease within 3 months of transfer and all except three within a year, it is probable that the majority of these became infected in the "out lines" although they did not develop symptoms until after they were transferred.

At the end of 1921, the population of the "factory lines" was 1,197 and that of the

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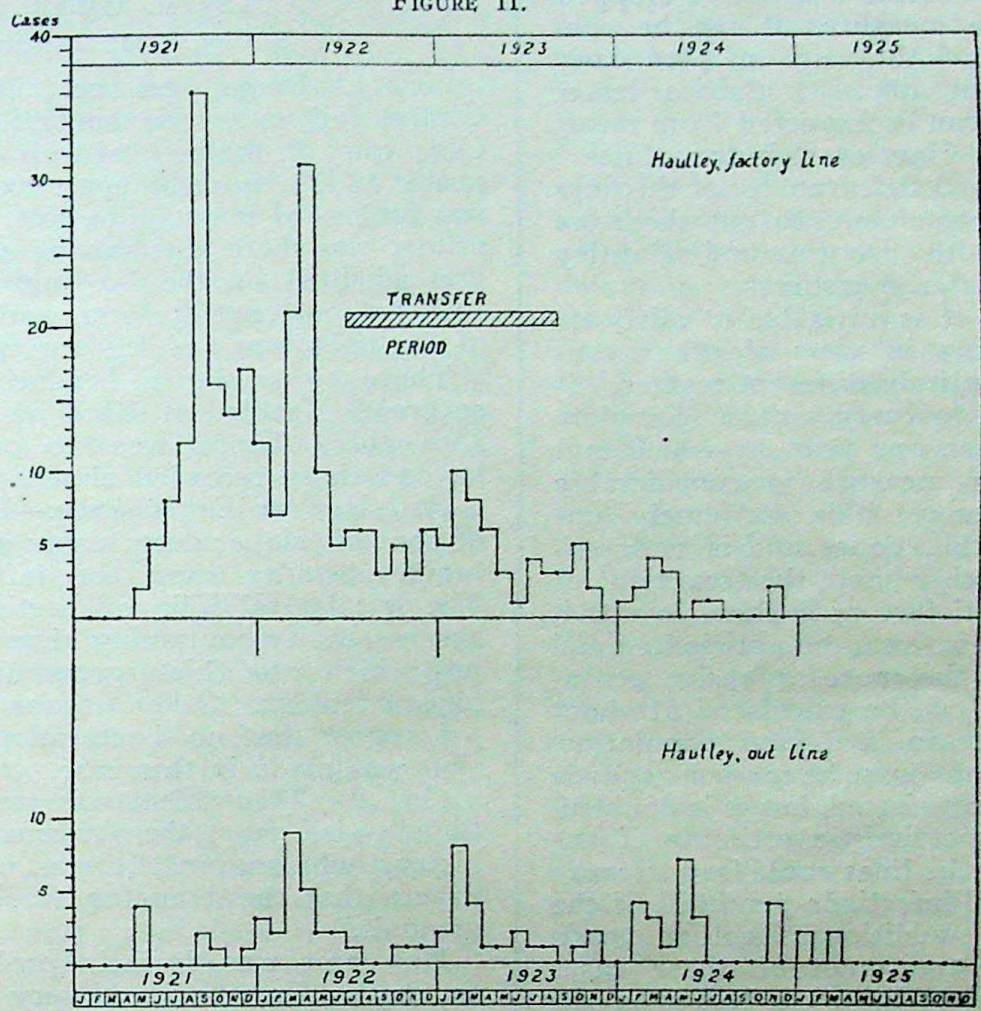
"out lines" was 1,581; in the former 289 cases of kala-azar, of which 29 were amongst the imported contacts, occurred and in the latter 80 cases occurred during 4 years; so that of the original force of the former garden 260, or 22 per cent. became infected and of the latter 109, or 7 per cent.

FIGURE II.



Let us first consider the effect of the measure adopted in the "factory lines." For the first year treatment alone was relied upon. This measure was apparently not very successful; a more careful examination of the data will however reveal the fact that it was not such a complete failure as the first glance at the figures appears to suggest. The first cases were noted in May 1921, then during the subsequent months an increasing number were listed each month; this state of affairs led to a thorough examination of all the members of the coolie force which in turn resulted in the revealing of a large number of cases in the month of September. It is very probable that most of these patients had been suffering from kala-azar for some time—as in most instances the aldehyde reaction was well developed—so that they had been a source of infection during the greater part of the year and certainly during the early part of the monsoon season, the period when it is probable (Napier, 1926) that the largest number of infections occur. Treatment at this point was merely closing the stable door when more than half the horses had escaped, consequently at the beginning of the next year another crop of cases appeared. During the next year the transfer of the lines was commenced so that the effect of treatment alone was overshadowed. The result of the combination of treatment and transfer of the lines was that during 1924—the year after the transfer was complete—the incidence in the garden fell to 14 and subsequently no cases have occurred.

In the other garden, the "out lines," the evidence suggests that the epidemic had not established itself prior to its discovery as in the case of the "factory lines," as in September when 36 cases were discovered in the other garden only two were discovered in the "out lines." There is, however, no reason to suppose that the epidemic would not have developed the same proportions in time had not measures been adopted to stop it. Figure II shows the partial success of these measures. It will be seen that despite the removal of all patients and contacts, cases continued to crop up for a considerable time; in 1924 when only 14 cases were listed in the other garden, there were 22 new cases listed in these lines and even in 1925 new cases were appearing. Such success as followed these measures was undoubtedly due to the fact that they were adopted from the very beginning of the epidemic; the failure to stop completely the spread of the disease is due to the fact that *segregation of the cases and contacts even when*

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combined with treatment, does not remove the whole source of infection.

CONCLUSIONS.

The conclusions that one draws from the experience in these two gardens is that by segregation and treatment alone the spread of the disease in an estate will not be stopped, but that by these measures it can be controlled, especially if they are adopted early (*vide* Hautley "out lines"); that a lesser degree of success can be expected from treatment alone (*vide* Hautley "factory lines," early measures); and that transfer of the lines can be expected completely to cut short an epidemic (*vide* both Dooria and Hautley "factory lines," later measures).

Whether or not it is advisable to advocate transfer of the lines in view of other considerations is an entirely different matter. It is seldom possible to carry out a complete transfer in less than one year, by which fact the value of this measure is considerably reduced. Furthermore, it is extremely unpopular amongst the coolies and is very expensive. On the other hand, the treatment of the disease is so satisfactory in these days that a 95 per cent. cure rate can be anticipated and the cost even for the more expensive pentavalent compounds can be calculated at about Rs. 5 per patient in a mixed population. Treatment would of course be carried out even if the lines were transferred, but it is doubtful even at a most pessimistic estimate if the failure to transfer the lines could lead to more than 200 additional infections per 1,000 of the population; the additional actual cost, Rs. 1,000, for the treatment of these cases would most certainly be much less than the cost of transferring the whole line.

Taking all things into consideration, therefore, the obvious policy to adopt, unless there are independent reasons for the transfer of the lines, is treatment of each case as it arises. If this is combined with repeated inspection of the coolies and careful observation of all suspicious cases and contacts a considerable degree of success can be anticipated.

Note. One of the writers (P. F.) has had an opportunity of applying these conclusions practically. On one garden under his medical control, 23 families and on another 16 families became infected with kala-azar during the years 1923, 1924 and 1925. All the patients were placed under treatment with urea-stibamine but no other preventive measures were adopted; in only 6 and 2 instances, respectively, have second cases occurred in these families.

CORRIGENDUM.

IN our issue for December 1926, on page 596 at the foot of the first column, under (5), in place of *Indian Medical Gazette* of June 1925, please read *Indian Medical Gazette* of June 1923.

A Mirror of Hospital Practice.

A CASE OF CEREBRAL ABSCESS AND ONE OF TUBERCULOUS PERITONITIS.

By M. UMAR,
5, *City Road, Allahabad.*

Case 1.—Durga, prisoner in the Bareilly Central Jail under section 395, *Indian Penal Code*, came to the hospital with fever, and quite unable to lift his right upper extremity. There was no loss of sensation to heat, cold and touch, neither was there any wasting of muscles. He was admitted on the 1st July 1923. On the 13th he could not speak a word and paralysis of the right arm and leg was complete.

There was slight headache (not very severe). He died at 12-30 midnight on the 15th July. There was no other symptom beyond those recorded above..

Post-Mortem Examination.—Body thin and of poor physique; dura mater adherent to the brain substance over the left lateral lobe. The left lateral lobe on section showed an abscess cavity containing about six ounces of pus which was thick, grumous, and darkish blue in colour. Other organs were normal.

I regret that no bacteriological examination was made in this case.

Case 2.—This patient was transferred to the Bareilly jail from the Andamans without any history whatsoever. It was written on his papers that the transfer was "on medical grounds."

His name was Itwari (probably born on Sunday). He was in a very bad state of health with enlargement of the spleen and liver. The heart sounds were weak. The spleen appeared to be much below the umbilicus and there were signs of bronchitis in the lungs. He was also anæmic. Oedema had commenced in both his feet and there was an afternoon rise of temperature up to 101°F.

Naturally he was treated with the most favourite drug in India, viz., quinine, but it proved of no use. After some time he began to pass both mucus and blood. I examined the stools under the microscope for amœbæ, but the result was negative. I also examined the sputum repeatedly for tubercle bacilli, but this result was negative also. The urine shewed traces of albumen. On the 28th July œdema was much increased. He died on the 9th of September at 9 p.m.

He was sentenced on the 17th November 1919, came to this jail on the 19th February, 1924, and was admitted to the hospital on the 24th June 1924.

Post-Mortem Examination.—The whole of the great omentum was very much thickened, so much so that it gave the appearance of an enlargement of spleen; also it was brittle.

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The large and small intestines were matted together absolutely in such a way that it was impossible to separate them, but they could be moved *en masse* like a football. There was a darkish red growth from the left to the right iliac fossa through which all the small intestines were attached to the pelvic brim and could only be separated by the aid of a knife. There was reddish fluid in the abdomen. The spleen was enlarged, but not so much as was suspected during his lifetime. Its weight was 24 ozs. It was concealed by the great omentum. The heart was fatty, and both lungs were congested and shewed pleural adhesions.

A piece of the great omentum and the growth from the small intestine was forwarded in spirit to the Central Research Institute, Kasauli. The report from the Central Research Institute, dated the 27th September is as follows:—The following is the result of the examination of omentum and growth from the small intestines taken from prisoner No. 1244, Itwari. Sections made from the material sent show chronic inflammatory conditions. They show cells of the inflammatory type with a large amount of formed fibrous supporting tissue. Throughout the sections are to be seen fairly extensive areas of necrosis and associated with many of these there are to be seen giant cells with peripherally situated nuclei. In these areas of caseation relatively numerous acid-fast bacilli were found. The blood vessels are not numerous, but are for the most part well formed and in some cases actually markedly thickened. There is no evidence of malignant disease and the condition is one of chronic infective granuloma of tubercular origin.

A CASE OF ARSENICAL DERMATITIS FOLLOWING INJECTIONS OF NOVARSENOBILLON.

By B. P. BANNERJI, M.B.,
285, *Kalighat Road, Calcutta.*

THE patient, a Hindu male adult, came to me for medical advice with a small hard chancre on the prepuce and a history of exposure to infection. Otherwise he looked healthy and stout, and gave no history of any previous severe illness. Accordingly, I tested his urine with negative findings, and gave him an initial dose of 0.3 gm. of Novarsenobillon. The reactionary symptoms were negligible, and he appeared to be doing well.

The second dose—0.45 gm.—was given on the eighth day of treatment, and the third dose—0.6 gm.—ten days later. As the injection made very little impression on the sore, and as the patient was impatient and asked for intensive treatment, a third dose—of 0.9 gm.—was given on the twelfth day after the third injection. In the meantime he was having local applications to the sore.

Immediately after the fourth injection he had a severe rigor, and the temperature rose to 103°F., with severe headache and nausea. These reactionary symptoms however abated within twenty-four hours. As ill luck would have it however, there was no appreciable change in the ulcer, and the patient became more insistent than ever on intensive treatment.

Up to this date he had shown no symptoms of intolerance to arsenic, and accordingly a fifth dose—of 0.9 gm.—was given ten days after the fourth injection. This time the reactionary symptoms were severe and on the third day after injection he developed intense jaundice and a maculo-papular rash all over the body, with excruciating pain and pruritus. Gradually his whole body swelled up, the mouth became full of aphthous patches, and fever continued without intermission. There was nausea and vomiting at times and he had complete loss of sleep and appetite.

The case appeared to be clearly one of arsenical dermatitis following on Novarsenobillon injections, with symptoms of acute yellow atrophy of the liver, and he was treated by a saline mixture orally and calamine lotion externally. Absolute rest was prescribed and a regulated diet. He gradually began to improve, and later Acnetox was given, which acted like a charm, and all the skin lesions subsided. He was subsequently given a general tonic and made an uninterrupted recovery.

A CYSTIC TUMOUR OF THE MESENTERY.

By J. B. VAIDYA,
MAJOR, I.M.S.,
District Medical Officer, Kurnool.

A MARRIED woman, aged about 30 years, was admitted to hospital for a tumour in the abdomen. The history was of one year's duration. The patient first noticed a swelling in the right lumbar region, which gradually increased, and she had irregular fever. On admission the tumour was found to occupy practically the whole of the right side of the abdomen from the pelvis right up to the under surface of the liver. It also extended across the middle line to the left, but not to such an extent as on the right side. The left iliac region was however resonant. A diagnosis of ovarian cyst was made and the abdomen opened in the middle line. The cyst was tapped and five gallons of a dirty brownish fluid came out. On exploring it was found that the cyst did not arise in the pelvis. The ovaries and broad ligaments were normal and well away from the tumour. The cyst was

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lying in the position of the leaf of the mesentery. Upwards it extended to the under surface of the right lobe of the liver and appeared to have pushed it to the left, since the gall-bladder was lying to the left of the middle line. Below, it extended to the brim of the pelvis on the right side. To the left it did not extend much beyond the vertebral column after it was empty. The intestines were pressed down. The cyst appeared to be in connection with the mesentery. The cyst was closed by two layers of sutures and the abdomen closed by through and through silk sutures. The temperature showed a rise, now and then, a week after operation. No malarial parasites were found in the blood, but after big doses of quinine the temperature did not show any rise. Soon after the operation she had diarrhœa, and about seventeen days after operation she passed blood and mucus in the stools for a couple of days. About three weeks after the operation the patient suddenly had diarrhœa and passed big motions which seemed to have the same sort of colour and appearance as the fluid withdrawn from the cyst at the time of the operation. It was curious to notice that the abdomen, which had been slowly filling up and was distended, became emptied out and no distension could be seen. The patient died a fortnight later as a result of parotitis and exhaustion. The abdomen did not show any signs of distension.

AN INTERESTING CASE OF FRACTURE OF THE SKULL AND INJURY TO THE BRAIN, ENDING IN COMPLETE RECOVERY.

By S. R. INGLE,

Medical Officer, Karjar, Colaba District.

A WELL-BUILT man aged about 30 was brought to this dispensary by the police on 3rd June 1926, for treatment of injuries he had received in a scuffle on 2nd June 1926. The injuries were said to have been caused by a *farsi* (hatchet) and sticks.

There were about eight wounds on his body. Of them the injury over the right parietal bone was serious. It was an incised wound measuring about 4½ inches in length, which had chipped the bone and caused damage to the brain. On examination of this wound three pieces of bone and about one drachm in weight of brain matter were found at its bottom. The cut was a slanting one. No wound of the dura mater, whence the brain matter might have escaped, could be detected. Owing to the sloping nature of the cut, the dura mater, I believe, might have been slit open underneath the bone and consequently the wound of the dura mater might have escaped detection.

Condition on admission.—The patient was conscious and remained so throughout his stay in the dispensary. His pupils were normal, pulse 90 per minute and regular, respiration 24 per minute and regular. There was no bleeding either from the nose or ears, and no paralysis. The temperature was 98°F.

Treatment:—The scalp was shaved round about the injuries, cleansed with 90 per cent. alcohol and then painted with tincture of iodine. After having removed the pieces of bone from the wound, it was gently irrigated with tincture of iodine (1 drachm to a pint), swabbed with B. I. P. P. and sutured, leaving in a piece of iodoform gauze as a drain. The remaining wounds, except two on the left side of the head, were similarly treated but closed without drainage. The usual dressings were applied, and the head bandaged. The patient was put on to the following mixture.—

Hexamine	..	10 grs.
Aqua	..	1 oz.

Sig:—Every 4th hour in a half-cupful of water.

This mixture was ordered with a view to preventing sepsis of the brain and meninges.

4th June 1926, 8 a.m. Temperature normal, pulse 80 per minute, no paralysis, no headache. Patient quite conscious, wounds clean. Gauze drain removed and the wounds redressed.

The subsequent history of the case was uneventful. The patient was discharged cured on 24th June 1926.

I wish to mention here that I have found B. I. P. P. very efficacious in the treatment of such wounds. I have observed no ill-effects from its use in very extensive injuries. The wounds, if treated by it within twelve hours or so after their infliction and suture, heal up by first intention. The usual strength of B. I. P. P. is:—

Bismuth Subnitras	..	1 oz.
Iodoform	..	2 ozs.
Paraffin Liquid	..	1 oz.

but I always use it in the following strength:—

Bismuth Subnitras	..	3 drs.
Iodoform	..	3 drs.
Liquid Paraffin	..	1 oz.

This is stirred up well in a pot and boiled over the spirit lamp. On boiling it assumes a reddish brown colour. It is then ready for use.

The interesting points in this case were the following:—

(1) The remarkable absence of cerebral symptoms, even after fracture of the skull and injury to the brain.

(2) The absence of sepsis, in spite of the fact that the wounds were tied up by the patient with a dirty cloth and that more than twelve hours had elapsed since their infliction.

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A CASE OF ASCITES CURED BY PERMANENT DRAINAGE OF THE FLUID INTO THE SUBCUTANEOUS TISSUE.

By D. N. KALYANVALA, M.R.C.S. (Eng.),
Chief Medical Officer, Porbander State.

A FEMALE patient, G. B., aged 35 years, was admitted to the hospital suffering from ascites. Her general condition was weak, the liver and spleen were very much enlarged, but the heart and kidneys were normal. Before her admission to the hospital, in spite of all medical treatment, she had been tapped eight times at intervals of about two weeks, and at each tapping nearly 20 pints of fluid were withdrawn.

Previously in similar cases I had tried artificial drainage by means of a short straight cannula and also by passing silk threads through the peritoneal cavity into the subcutaneous tissue of the groin, but after two or three weeks the fluid again began to accumulate.

For this case I devised a curved silver cannula about 2 inches long with two circular flanges at the curved end.

A semi-circular incision was made in the left iliac region and a flap of skin was turned down. The muscles were split by McBurney's method and an opening made into the peritoneal cavity. One flange of the cannula was inserted in the peritoneal cavity and a purse-string silk suture was passed through the peritoneum and tied tightly round the neck of the cannula between the two flanges.

In order to keep the cannula in position it was fixed to the muscles by means of silver wire passed through the holes in the outside flange. The straight end of the cannula pointing downwards was inserted in a pocket made in the subcutaneous tissue. The muscles were stitched together and the skin united by metal clips.

At the time of the operation I had left half the quantity of fluid in the peritoneal cavity. Later on this was evidently draining well, as on the third day after operation there was marked collection of fluid in the subcutaneous tissue of the left iliac region, groin, and vulva.

In order to remove the excessive pressure of the fluid I tapped the patient in the right iliac region and removed all the fluid. Compresses of lead lotion were applied to the swollen parts and the swelling rapidly subsided. The clips were removed on the sixth day and the wound was quite healed.

The operation was performed on the 11th June, and the patient was discharged on the 29th June, after keeping her under observation for 18 days. The patient's husband reported to me four months later that she was well and that there was no sign of the fluid refilling.

A CASE OF ANGIO-NEUROTIC ŒDEMA.

By EDMUND BURKE, L.R.C.P., L.R.C.S. (Ed.),
Medical Officer, Mangaldai Medical Association, Assam.

SIX weeks ago, Mrs. X, a European lady, while playing "bridge" in partnership with me, suddenly complained of intense itching and burning of the skin of the neck, arms, and shoulders.

This occurred twice more in the course of the next half-hour greatly irritating the lady who complained feelingly of these "awful attacks of prickly-heat."

However, shortly afterwards, large, tender, red and sharply-circumscribed swellings appeared on the patient's neck, back of the fingers, hands, arms and face, affecting the eyelids and lips, so much so that her features were greatly distorted. On sitting, the patient complained of pain and swellings of both buttocks also. The symptoms puzzled me at the time and, the diagnosis being uncertain, a soothing lotion was applied temporarily, and it afforded some alleviation of the irritation. Next morning all swellings had disappeared except some slight œdema which still remained on both hands.

The next night I was asked to see the lady as she was again affected by the same symptoms and was much distressed, as the lips were more swollen than on the night before. I learned that this attack occurred at almost exactly the same time (7 p.m.) as the first one. This time the patient remembered a similar, though infinitely milder, attack three weeks before when in Shillong—but never before that. There was no hereditary history of the disease. One or two members of the family had had skin troubles (acne, eczema) and rheumatism. The lady denied any irregularities of diet or susceptibility to any particular food. No gastro-intestinal disturbance occurred in this case in association with the above symptoms, though such manifestations are said to occur sometimes. From the character of the œdematous swellings and their periodicity and transient nature the above diagnosis was made. A hypodermic injection of adrenalin hydrochloride 1 : 1,000 m.x. was administered and in the space of an hour all symptoms had subsided. The lady remained well for a week, when another milder attack occurred (again at night and about 7 p.m.) but once more disappeared rapidly with the same treatment, and no more attacks have occurred since. The interesting feature of the case was its remarkable periodicity, the three attacks occurring at about 7 p.m. each time, as in Matas' case described by Osler (*Practice of Medicine*, 9th edition, p. 1115). I was gratified at the success of the adrenalin treatment, as the treatment of these cases is said to be unsatisfactory (Osler) and in my case it was largely in the nature of an experiment that I used the drug

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mentioned. It is yet to be seen if the cure is permanent.

NOTES IN OPHTHALMIC PRACTICE.

By K. G. JAVA, M.B., B.S.,
Touring Medical Officer, Blind Relief Association, Tharparkar District, Umerkot, Sind.

THE following notes are the result of a year's experience as a touring medical officer engaged on ophthalmic work:—

(1) *The use of atropine before cataract extraction.* Whilst extracting cataracts by the intracapsular method, I found that eyes in which the pupil did not dilate after cocainization offered greater difficulty in the extraction of the lens than eyes in which dilatation of the pupil occurred. I therefore tried the effect of instilling a tiny drop of atropine (1 per cent. solution) before beginning cocainization, and have found that the extraction becomes considerably easier in such cases. I have only so far tried this on four or five cases, so cannot give any opinion as to the value of the method, but it appears to be worth a trial.

(2) *Cyanide injection for pannus.*—The injection of about 1 c.c. of a 1 : 2,500 solution of cyanide of mercury subconjunctivally gives such marked improvement in cases of pannus that I think the method to be worth further trial. The text-books recommend touching with copper sulphate for this condition, but this has not proved efficacious in my hands; in fact some of the cases appear to get worse.

(3) *Painting the lids with silver nitrate,* grs. 60 to oz. 1, for severe cases of trachoma has proved to be wonderfully efficacious. Of course any excess of this fluid must be at once removed by flushing out with normal saline.

(4) *Intravenous injections of iodine in a suppurating wound after cataract extraction.*—In two of my cataract cases the corneal wound suppurated. There was no panophthalmitis, but pus could be seen at the incision and a small quantity in the anterior chamber. I gave an intravenous injection of iodine (tincture of iodine 5 m. in 5 c.c. of distilled water), and the result was marvellous. The pus cleared completely in one case after one such injection, and in the other after two such injections. This suggests that intravenous iodine might be of use in the treatment of hypopyon ulcer also.

A NOTE ON THE STAINING OF TUBERCLE BACILLI.

By C. P. V. SHUNKER, I.M.S.,
Medical Superintendent, Central Jail, Bellary.

DR. A. D. GARDNER in the *Lancet* of 5th June, 1926, gives an account of his method of staining tubercle bacilli with picric acid as a counterstain instead of methylene blue. As there is a 40-bed tuberculosis annexe attached to this jail, there have been unusual facilities for giving the method a trial. During the last five months over a hundred examinations were carried out on the sputa of tuberculosis patients. In all these cases the stain has been found to be infinitely superior to the Ziehl-Nielssen's carbol-fuchsin method usually employed.

The method of staining is as follows:—A little of the sputum is placed on a glass slide and spread out into a thin layer and allowed to dry. It is then fixed by passing the slide through a spirit lamp flame. An oblong strip of filter paper cut to the size of the slide is then placed on the film and carbol-fuchsin poured on and heated over the spirit lamp till it steams. The placing of filter paper over the slide has the double advantage of holding up the dirt from the carbol-fuchsin and also retards the evaporation of the solution. The slide is then washed in water and the film is decolourised with 25 per cent. sulphuric acid solution in water. When the film has been almost completely decolourised it is washed in absolute alcohol and then in water. Then a half saturated watery solution of picric acid is poured on the film and allowed to remain for 5 to 10 minutes. The slide is then washed and dried and is ready for examination, which does not take more than two to three minutes to reveal tubercle bacilli, if there are any.

The above process is merely the substitution of picric acid for methylene blue as a counterstain. The advantage of the method lies in the fact that the red stained tubercle bacilli show up much better against a yellow background than a blue one and it appears to have the additional property of restoring the colour to feebly acid-fast bacilli, which would otherwise be invisible or unrecognisable.

In our series a certain number of cases admitted are labelled "tubercle bacilli negative," but tubercle bacilli were easily detected by the picric acid test. In many cases a comparison was made between the two methods from the sputum of the same patient and while Ziehl-Nielssen staining showed no tubercle bacilli or a few doubtful bacilli, the picric acid method showed large numbers clearly.

It is hoped that others will give this method a trial and find it as useful as we have done.

BERBERINE SULPHATE IN ORIENTAL SORE.

By R. L. VARMA, L.M.P.,
Ferozepore Cantonment, Punjab.

ORIENTAL sore—a disease which is very common in the Punjab—is very refractory to the

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forms of treatment usually advocated for it such as local applications of carbon dioxide snow, tartar emetic ointment, or antimony salts intravenously. Some of these renowned treatments are very costly and out of the reach of the poor type of patient and only available in big hospitals; others are so prolonged that the patient tires of the treatment before it is ended; whilst intravenous injections of antimony salts are not entirely devoid of danger.

In the year 1911, I remember to have read in the *Indian Medical Gazette* that the continuous application locally of *rasout*—a dry extract of *Berberis indica*—was found to be of benefit in some cases. I tried this on several cases, but without success. The results being so disappointing I discontinued this form of treatment, but a long time afterwards it occurred to me to try the alkaloid berberine instead. After dissolving ¼ gr. of berberine sulphate in 1 c.c. of distilled water and sterilising the solution, I infiltrated the sores of a patient with this solution by means of a hypodermic syringe. This was followed by some local reaction in the form of congestion and œdema, but with very little pain and tenderness, all of which subsided within four days. A week later I repeated the infiltration with the result that the patient was entirely cured, to my surprise and gratification. He did not require a third injection.

I have since followed this line of treatment in many cases without a single failure and am now led to believe that in berberine we have a specific cure for oriental sore, similar to that of quinine for malaria. Most of my cases have been cured by two—or at most three—local injections.

I suggest to my professional brethren in India that they should investigate this line of treatment. In the Punjab, kala-azar is almost entirely absent, and I have seen no case of that disease in the whole of my sixteen years of practice in the Province; but it is possible that berberine may prove a remedy suitable for injection in cases of kala-azar. I can only leave it to others to test this suggestion.

A CASE OF SEPTICÆMIA TREATED BY INTRAVENOUS INJECTION OF IODINE.

By B. L. CHOPRA, L.R.C.P., L.R.C.S., D.P.H., D.T.M. (L'pool),
District Surgeon, Lonavla

A PORTER from Shahbad was admitted into Sholapur Railway District Hospital on 28th July, 1926 suffering from a crushed right arm as a result of an accident at Shahbad on 27th July, 1926, at night.

His temperature on admission was 101°F and he was given 1,500 units of antitetanic serum. Constitutionally he looked a very weak individual and the condition of the wound was rather septic. He was operated upon by me the next morning. Amputation by the modified circular method was performed a few inches below the shoulder joint, and a drainage tube inserted. The following are brief notes of this case after operation:—

28-7-26. Temperature 102.5°F in the morning, and 103°F in the evening. One pint of saline given intravenously. Blood films examined for malarial parasites with negative result. 10 c.c. of anti-streptococcal serum given intramuscularly. He had a severe rigor in the evening: a further blood film was taken and examined but no malarial parasites found.

29-7-26. Temperature 104.6°F in the morning and 105°F in the evening. A further 10 c. c. of anti-streptococcal serum was given intramuscularly, and 2 pints of saline intravenously.

30-7-26. Temperature 103.8°F in the morning. At 1 p.m. a dose of 40 minims of iodine solution containing ½ grain of iodine was given intravenously. At 5 p.m. the temperature was 102.1°F. The wound was throughout dressed with 1 : 1,000 acriflavine solution.

31-7-26. Morning temperature 105°F. The intravenous injection of iodine was repeated at 1 p.m. The temperature at 5 p.m. was 102°F.

1-8-26. Temperature 99°F. in the morning. The same dose of iodine was given intravenously. Temperature 99.5°F in the evening.

2-8-26. Temperature 98.4°F in the morning and 99.5°F in the evening. It then fell to normal and remained normal; the patient being discharged from hospital cured two weeks later. He was soon on a meat diet, and was given tonics.

The daily injections, each of 1|2 grain of iodine in 40 minims of distilled water, appeared to have brought the fever under control very rapidly.

A CASE OF ACCIDENTAL ABDOMINAL INJURY.

By T. P. VARMA, M.B.,
Assistant Surgeon, Deoghar, Santhal Parganas.

ON the 25th April, 1926, at about 3 p.m., a Mahomedan male aged about 30 years, a labourer, was brought to the Deoghur Charitable Hospital with a wound about 2 inches long, situated horizontally on the left side of the abdomen, at the level of the umbilicus, from which some portion of the small intestine with the omentum was protruding.

While drawing water from a well supported on a wooden beam, the latter suddenly gave way, and the man fell down into the well, the above injury being caused by the broken beam. The man was brought into hospital with the

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coil of the intestine covered with a very dirty dry piece of cloth.

The patient was chloroformed and the gut was washed with warm saline and "E.C" lotion (1 drm. to the pint). Laparotomy was done as the gut could not be replaced through the wound. The coil and the mesentery were replaced and the wound stitched up.

On the 3rd May the stitches were removed and the injury and the laparotomy wound healed up by first intention, though the man had to be kept in hospital for the treatment of some other injuries. There was some rise of temperature for the first four days, the highest rise being to 103°F. From the fifth day the temperature continued to be about normal.

The special features of the case are the escaping of the gut uninjured, and the absence of any complication though the gut had been covered with a dirty piece of cloth.

I am grateful to the Civil Surgeon, Santhal Parganas, for kindly permitting me to publish the notes of this case.

A CASE OF BILATERAL DISLOCATION OF THE MANDIBLE.

By SATISH CHANDRA DAS, M.B.,
Mayo Hospital, Nagpur, C. P.

GANGARAM, Hindu male aged 26, a resident of a village about 28 miles from Nagpur, was brought to the surgical out-patient department of this hospital on the 25th October, 1926. His mouth was wide open, he had a parched expression, and was emaciated. His relatives stated that as the result of a violent fit of yawning five days before he could not close his mouth. I immediately wrapped a piece of gauze around each of my thumbs, put each on the cutting surface of the lower molar teeth on each side and pressed downwards, whilst the other fingers of each hand were directed towards the chin and exerted upward pressure. Within ten seconds the mandible rolled back into place in the mandibular fossa and the patient was immediately able to close his mouth. This method of reducing a dislocation at the temporo-mandibular fossa is, of course, a well known one.

The patient and his relatives were amazed at this immediate result, and the former prostrated himself as if in the presence of a diety in a temple. On further enquiry as to why the patient had not been brought for treatment sooner, the relatives said that at first, in accordance with the instructions of a local *vaidya*, external applications were applied. When these proved of no avail, they supposed that he was possessed by an evil spirit, and called in an *ojha* (ghost-exorcist) who made the patient undergo some rites and peculiar exercises, in spite of the fact that the poor fellow was by then practically starving. When *mantras* and the mysticism of the "specialists"—according to their own claims—could give no relief, and as the patient was getting more and more exhausted, they decided to try the local official civil hospital.

Cases such as this go a great way in creating confidence and regard, especially among village folk, in modern scientific medicine. This case also illustrates how much unfortunate patients sometimes have to suffer for the whims, hobbies and superstition of themselves and their friends, which may—and at times even do—cost them their lives.

A CASE OF SURGICAL EMPHYSEMA FOLLOWING FRACTURE OF THE 5TH AND 6TH RIBS.

By N. CHATTERJEE, M.B..
Domjore, Howrah District.

History.—An old man of 60 years, an habitual drunkard, had a merry evening. He went to the pond to wash himself, and slipped accidentally and fell on the pavement. He walked home a distance of three miles and I was called to see the patient next day for cough and hæmoptysis.

On examination I found the 5th and 6th ribs displaced inwardly, and the patient could not bear any pressure, however slight, on the ribs. Strapping being impossible at that stage, I wanted to displace the ribs outwards and asked him to submit to surgical interference, which he refused.

Treatment.—Calcium, opium and a purgative by the mouth. I kept him without any pillow.

I did not see the patient for five days and I was told that some evil spirit was working on him and this spirit had inflated his whole body and the man was unrecognisable, and many *mantras* were being chanted to drive out the evil spirit but with no effect. Preparations, were being made to carry him to the Ganges, as the quacks had declared him hopeless and pulseless. I hurried to the spot uncalled for and with greatest difficulty persuaded them to abandon the scheme of killing the man.

On examination, I found the heart normal, a few râles and some dullness at the base of the lungs, the pulse deceptive on account of the huge swelling of the hands. From the forehead to the toes the whole body was swollen and gave the characteristic crackling of surgical emphysema. The man looked double his former breadth and circumference. He was swallowing his food all right except for slight difficulty. At last I was given 8 hours' time to prove that he would not die. The daughter sided with me, and the party agreed to abandon their scheme for the time being. I wanted to make a few punctures, but the relatives refused to consent.

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I gave him a good strapping of adhesive plaster over the whole of the right lung, and a pad of cotton over it, firmly pressing against the fractured ribs. I gave him an injection of morphia for the cough. After cleaning the extremities I strapped the extremities with bandages and tried to prop the patient up in bed, but he could not bear this. I kept my compounder waiting there, and implored the daughter not to allow the patient to be taken away without my permission.

Next morning the quacks and the relatives saw me at my place and drew my attention to the fact that I was not allowing the old man to be taken away to the Ganges, and thereby going against Hindu customs and religion. They drew my attention to his drowsy conditions, which I explained them as the result of the morphia and asked for another 12 hours' time. To make a long history short, I managed with greatest difficulty to rid the patient of the most trusted "lieutenants of Lord Chitragupta of Jompore." I am glad to say that to-day the patient is perfectly fit and following his usual avocations.

A CASE OF ASCARIS INFECTION SIMULATING CHOLERA.

By Y. S. ROW, L.M.P.,

Markapur, Kurnool District.

EARLY in September 1926 I was called in to see a boy aged 12, suffering from diarrhœa and vomiting. At the time cholera was prevalent in the surrounding villages but not in the village in which the boy lived. I was told that the boy had passed 12 watery stools during the night, and had vomited 8 times. I found the patient in a state of collapse, his body cold and clammy, the pulse rapid and feeble, the tongue dry, with a tremendous thirst and cramps in the legs. In brief he suggested the clinical picture of cholera.

There had been no cases of cholera however in the village in which he lived. Without waiting to make a diagnosis, I gave him two pints of hypertonic saline solution with glucose and adrenalin intravenously. I also ordered 10 minims of liquor adrenalin hydrochloride to be dropped under the tongue every hour for six doses.

When I saw the patient six hours later, complete reaction had set in, his condition was much better, the pulse tension was moderate. I was told that he had had four watery stools and had vomited three times since I had seen him before; also the important fact was elicited that when he had last vomited he had brought up a round worm. I now suspected that the condition might be due to Ascaris infection, since the symptoms due to this infection are often very severe and of very varied character. I immediately gave a full dose of santonin—grs. 5—the same day. By the next morning, without any additional purgative, the boy had passed 43 round worms, and continued to pass round worms both orally and *per rectum* for the next week,—the total number passed being 164 worms.

A second dose of santonin was given on the fourth day in order to finally eradicate the infection and the patient made an uneventful recovery.

The case is of interest as shewing the very severe symptoms to which Ascaris infection may give rise.

THREE INTERESTING CASES OF MALIGNANT DISEASE.

By J. B. VAIDYA,

MAJOR, I.M.S.,

District Medical Officer, Kurnool.

Case 1. An Extensive Carcinoma involving the Transverse Colon.

A HINDU male aged about 30 was admitted for ascites of six months' duration.

The patient was wasted and anæmic. The abdomen was very tense and distended, with prominent veins on the surface. There was an enlarged gland in front on the right side of the chest about one inch below the right nipple. The liver and spleen could not be felt. The abdomen was tapped and about 5 pints of reddish fluid came out. With the abdomen lax one could feel hard masses in the abdomen. One mass was felt lying transversely at the level of the umbilicus and two more were found in the lower part of the abdomen. An exploratory laparotomy was carried out. The great omentum as such could not be seen. It was rolled up into a mass in the growth. The splenic flexure of the colon and the transverse colon were involved in the growth which was hard and nodular. Growths were also found in the mesentery and the mesenteric glands. There were secondary carcinomatous deposits in the liver. The stomach and the duodenum did not show any malignant growths. The man lived for a few days but died of exhaustion and shock. A post-mortem could not be obtained.

Case 2. A Case of Carcinoma of the Pancreas.

A man aged about 50 was admitted for pain in the region of the stomach and gradual wasting. The man had worked as a coal miner in South Africa. There was no history of syphilis, or of jaundice.

On examining the abdomen a hard nodular mass was felt, about an inch above and to the right of the umbilicus. The abdomen was sunken and the supraclavicular glands were enlarged on the right side.

There was no vomiting and the appetite was fairly good. There was no albumin or sugar

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in the urine. The man was advised operation for gastric carcinoma, but refused. The patient was kept in hospital for three months, during which time the pain increased in severity but there was no vomiting. There was great emaciation. The patient gradually got weaker and weaker and died. A partial post-mortem was done and on opening the abdomen, the stomach and the pylorus, and the duodenum did not show any growth; but the pancreas was enlarged, hard, and adherent to the posterior abdominal wall.

Pathological report.—Adeno-carcinoma of the pancreas.

Case 3. Sarcoma of the Breast.

A woman aged about 35 was admitted for a tumour, the size of a mango, in the right breast. She gave a history of an operation done three years previously for a tumour in the right breast. The records showed that a fibro-adenoma was removed from the breast. The tumour was freely movable on the subjacent tissues and felt hard and globular. The skin was not adherent to it. There were no enlarged glands. The tumour was thought to be carcinomatous and was removed along with the pectoralis major muscle. On removal the tumour was found to have a capsule, and a few cavities in which proliferating masses were seen in one part of the tumour. The pathological report on the tumour was that it was a spindle-celled sarcoma. The case is thought worth recording as sarcoma of the breast is believed to be rare. Sampson Handley however, says that "the routine histological examination of tumours of the breast has shown that sarcoma of the breast is much more frequent than it was formerly thought to be."

A CASE OF IMPERFORATE HYMEN.

By P. BHASKARA RAU,
Medical Officer, Local Fund Hospital, Narasapatam.

R. P., a girl aged 14 of the agricultural class, was brought to me on the 6th April, 1926, for relief of retention of urine. She gave a history of difficulty in micturition for the past fortnight, with great pain during defæcation; and for the last three days had had complete constipation and retention with overflow of urine.

When she was being prepared for catheterisation, a condition of completely imperforate hymen was discovered. Enquiry elicited the fact that she was married, but that her husband was in Rangoon and that the marriage had not yet been consummated. She had attained puberty six months previously, but had never menstruated. Her mother-in-law threw out dark hints that the girl was about to become a mother before ever she was a wife, but this slander the patient indignantly repudiated. Hence her relatives had brought her for medical opinion.

At operation no vaginal orifice could be discovered, whilst there was a bulging mass between the labia, covered by a thick and glistening membrane. The external urethral orifice was drawn up, whilst the anus was everted and the anal condition resembled a severe case of hæmorrhoids. A catheter was passed with difficulty and about 30 ozs. of urine was drawn off. The bowels were relieved by enemas, and operation performed the next day under a general anæsthetic. I first stabbed the tumour with an exploring needle (to confirm the diagnosis, since the medical man in the *mofussil* cannot afford to make mistakes), when a few drops of thick dark blood escaped. An incision was then made through the lower part of the membrane, when 22 ozs. of thick, dark, and offensive blood-stained fluid escaped. The vagina was opened out and douched with hot lysol lotion, and then packed with lysol gauze. For a few days a thick rubber tube was kept in the incision in order to keep the orifice patent. At operation the uterus was found high and drawn up, but otherwise normal. The patient made an uneventful recovery and was discharged cured a week after operation.

I wish to thank Dr. N. Venkataswami Chetti, District Medical Officer, for kindly permitting me to publish the notes on this case.

A CASE OF LARGE OVARIAN CYST IN A YOUNG WOMAN.

By M. K. PILLAI, B.A., M.B., C.M.,
Civil Surgeon, Pegu, Burma.

THE patient, a Burmese woman, aged about 22 years, married but with no children, was admitted to hospital with an enormous abdominal tumour of about one and a half years' duration. The tumour occupied the entire abdominal cavity, extending above to the costal arch, pushing the spleen and liver before it, below to the symphysis pubis, and to Poupart's ligaments on both sides, and backwards to the erector spinæ. It was tense and fluctuating on the right side, and hard on the left side. The patient had been married a year before admission and stated that at that time the tumour was in the left iliac region and about the size of a walnut. The menses were regular but scanty. Her temperature and pulse were normal but she was rather anæmic and subject to asthmatic trouble, probably due to the mechanical pressure from below of the tumour, whilst the urine shewed a trace (only) of albumin.

After a week's treatment with tonics and mild laxatives, operation was performed under chloroform anæsthesia. The tumour proved

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to be an ovarian one, and about 20 lbs. of a brownish-white gelatinous fluid were evacuated on tapping it with a trocar. It was a large multilocular cyst of the left ovary, whilst the right ovary was also found to be cystic and about the size of a small walnut, and was therefore, also removed. The patient made an uninterrupted recovery, except for some dragging pains in the abdomen on the second and third days after operation—in all probability due to the displaced abdominal viscera resuming their normal locations. She was discharged quite hale and well from hospital after a fortnight's stay, and with an abdominal support.

The interesting features of the case are—

(1) The very large size of the cyst in so young a woman, and

(2) The rapidity of the growth.

The patient has since been seen three months after operation, and was apparently quite fit, but had had no return of the menses.

A CASE OF PAROVARIAN CYST.

By Rai Sahib CHHAGAN NATH,

Chief Medical Officer, Dungarpur, Rajputana.

A HINDU woman, aged 40, a primipara, came to the Bijey Hospital, Dungarpur, stating that she had suffered for ten years from a growth in her abdomen. She added that the growth was at first felt on the left side but had gradually grown until it ultimately filled the abdominal cavity. On examination externally and

per vaginam, the tumour was discovered to have burrowed deeply into the pelvic cavity, chiefly to the left of the uterus.

Operation.—The abdominal wall and peritoneum were incised over the prominence of the tumour at a site as little vascular as possible, and the hand inserted. A few minor adhesions were found and broken down. The cyst was then tapped and yielded 19 pints of clear, limpid fluid. The layers of the broad ligament were divided in front and at the back, and the tumour was finally delivered by blunt dissection, with occasional snipping by the scissors. The bed of the tumour was then sponged dry, the broad ligament incisions sutured, the peritoneal toilet made, and the abdominal wound closed. The wound healed by first intention, and the patient was discharged cured in three weeks.

The photograph shews the patient before operation.

A CASE TYPICAL OF RURAL MIDWIFERY PRACTICE.

By C. G. DHANDHUKIA,

Medical Officer in-charge Jesar Dispensary, Bhavnagar State, Kathiawar.

THE following case presents many points of interest and is in itself a reply to the last paragraph of Dr. Jhaveri's article "An interesting case of transverse presentation" in the *Indian Medical Gazette* for December 1925.

A farmer's wife, well-built and of healthy physique, aged about 17 years, was seen by me in labour at 10 p.m. on the 19th July 1926 at her house in an adjoining village in response to a hurried and urgent call. Her history was that she had completed full term, had had no illness during pregnancy, and that she had commenced to feel weak pains thirty-two hours previously. Her abdomen had been massaged by friends and two hours later a fœtal hand prolapsed and appeared. Her female attendants subsequently tried lubrication with *ghee*, traction, friction and massage with a view to delivery, but were unsuccessful.

She was a primipara and the pulse of good tension. The pains, however, were irregular and ineffectual and the fœtal heart sounds absent. The right upper fœtal extremity was protruding through the genitals and was swollen, black in colour, with no pulsation anywhere in the protruding fœtal limb. The limb was covered with *ghee*, as also were the maternal parts. Digital examination shewed that the cervix had contracted on the protruding parts, all amniotic fluid had been lost, the fœtus was jammed in the pelvis, and the condition present was one of dry, difficult, and obstructed labour. Hospital conveniences, assistants, chloroform, etc., were not available, the cottage conditions were the worst possible, with a very poor light, no

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Barnes or de Ribes' bags or other hydrostatic dilators were to hand.

Having nothing else available, I thought of giving chloral, and at once gave 10 grains of chloral hydrate in solution. The same dose was repeated an hour later, but relaxation of the parts did not occur. The patient by degrees became drowsy between the pains, and manual dilatation of the vagina—which in this primiparous patient was rather narrow—was gently commenced. The uterus still remained firmly contracted on the fœtal parts. As the fœtus was undoubtedly dead, the protruding limb was cut off, and not a drop of blood escaped. By combined gradual internal and external manipulation the fœtus was turned, and a breech presentation secured. Shortly afterwards a full term, dead male fœtus was delivered by natural efforts without further trouble, and the placenta came away by natural expulsion. The patient made an uneventful and complete recovery and is today in good health.

The case is remarkable for the entire absence of puerperal sepsis in spite of (*1*) premature rupture of the membranes and the meddlesome midwifery of ignorant female attendants; (*2*) the many hours of obstructed and protracted labour; (*3*) death of the fœtus; (*4*) the damp septic atmosphere of the monsoon with a feeble illumination, no assistance, and a complete absence of all ordinary facilities; and (5) manual interference with the delivery. I have purposely used the word *ghee* instead of its English rendering boiled butter, lest it be understood that it was butter recently boiled and therefore sterile. This was not the case. I have since used chloral hydrate in other cases in my practice and have come to the conclusion that the drug is of special value under such difficult circumstances.

In all probability the transverse presentation in this case was due to the massage carried out by untrained hands at the commencement of labour—a practice which is very common in India. The qualified—and especially male—practitioner in India is only called in when an impasse is reached; and the whole case is typical of midwifery under rural and *mofussil* conditions in India.

TWO INTERESTING CASES OF MALARIA.

By SATYA KINKOR BISWAS, L.M.,

Medical Officer, Kirkind, Kusunda P. O., Jherria Coal Field.

Case 1.—I was treating a patient suffering from what appeared to be cerebral malaria at Bansjora, E. I. Ry., when, during one of my visits, the brother of the patient was shewn to me as he was suffering from slight fever, his temperature being 100°F. Except for slight fever and a coated tongue I could find nothing wrong with him and I prescribed fractional doses of calomel, to be followed by sodium sulphate, and left the house at about 11 a.m.

Two hours later a man came in a taxi to inform me that the second patient—a young lad aged about 18—had suddenly become delirious and unconscious and was lying in this state on his bed. I went to see him at once and found him unconscious, with the tongue protruding, saliva trickling from his lips, a temperature of (only) 101°F, pulse 105 and feeble, respiration rate 30 per minute. His heart, lungs and reflexes were normal.

As I could not find out what was the matter with the patient, I prescribed liquor adrenalin hydrochloride, 1 : 1,000 solution; m. 5 every 4 hours for 3 doses, and cold application to the head. Four hours later I again visited the patient and found him in practically the same condition. In view of the fact that his brother was suffering from cerebral malaria, I gave him an intramuscular injection of 5 grs. of quinine. The following morning I found him much better, and subsequent intramuscular and oral administration of quinine cleared up all his symptoms.

Sudden unconsciousness with a relatively low temperature must surely be uncommon in cases of malaria.

Case 2.—I was called in to a colliery to see a child aged 3½ years old suffering from convulsions. The history given was one of chill and slight fever for the previous 2 days, with the onset of convulsive fits that morning, the fits growing steadily more and more frequent and intense. The child had only come to the colliery 6 days previously from a severely infected malarious village where his relatives were suffering from malaria.

On examination I found the temperature to be 99.8°F, the pulse of good tension, slight rhonchi in the lungs, the heart and abdomen normal. The breathing however was sterterous and jerky, tending towards a choking condition at the time of the fits, with the limbs rigid during the fits. I called in Colonel Price, I.M.S., in consulation, but we could give no definite diagnosis, and castor oil and chloral and bromides were prescribed for the night. In the morning I found the patient with a temperature of 104°F, and considering the history of malarial attacks in the household where he had lived, I gave an intramuscular injection of 2½ grains of quinine, with 1½ grs. t.d.s. by the mouth. The patient made an uneventful recovery. Later on, I learnt that blood films taken from the patient at the time when he was seen in consultation had shewn the presence of the parasites of benign tertian malaria.

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Indian Medical Gazette.

FEBRUARY.

NEW LIGHT ON THE EPIDEMIOLOGY OF CHOLERA.

SIR LEONARD ROGERS has spent twelve months of intensive work on the epidemiology of cholera. The record of his labours is published in the *Proceedings of the Royal Society of Medicine* for 1926 (Vol. XIX). Sir Leonard was struck by the fact that there was still much to learn about the incidence and spread of cholera over India. Spread of infection by human travel is by no means the sole factor, the disease spread just as rapidly in 1817-18 as it did in 1859-71. Even now the sequence of events is much the same as it used to be in spite of the great increase in the speed of travel. In 1869 Bryden showed that the Punjab epidemics coincided with the spread of the south-west monsoon, and so originated the view that the disease was spread by the wind. The spread of the disease does not follow the lines of railway travel.

Remarkably accurate information exists about the 1817-19 epidemic, which was recorded by Jameson. In August and September 1817, the disease was epidemic over most of Bengal and in November it attacked Hasting's Army in the south-east of the United Provinces. As usual, it died down in the cold weather but in March 1818 it appeared at Allahabad and Banda, and spread all over the United Provinces in April and May, reaching the Punjab in the rainy season July to September. From the north of the Central Provinces which were affected in April it spread due south, reaching Hyderabad in July, and thence east to the coastal districts of Madras and to the south of Madras province, which was infected in August and September. From the north of the Central Provinces another wave spread west and south-west, reaching Bombay in August. This terrible epidemic travelled in much the same way as most of the subsequent outbreaks up till 1870, which followed the same routes in spite of the opening up of railways.

Bryden in 1870 after a careful study of several epidemics reached the conclusion that cholera is "dependent on an atmosphere of moisture for epidemic invasion."

Rogers, independently, reached the same conclusion before he had read Bryden's work, but he differs from Bryden's view that the spread is by moisture-laden wind. Rogers finds no evidence of *regular* cycles such as were described by Major Russell and several of his predecessors, and agrees with Cornish that epidemics occur at irregular intervals dependent on factors which he (Rogers) has worked out.

It is interesting to note that Andrew Duncan's career in India was ruined because he dared to write a paper opposing Cunningham's wind-borne theory of the spread of the disease and his belief in the non-infectious nature of cholera. At this time (1884), the Government of India actually forbade its servants to publish views suggesting the spread of the disease by human intercourse. Rogers finds that the relationship between cholera epidemicity with air temperature and relative humidity is inconstant, but when he examined the records he found that when absolute humidity is below 0.400 during the cold weather, cholera falls to a very low rate or disappears altogether. In Assam and Lower Bengal, the winter decline of the disease follows shortly after the period of lowest absolute humidity. The absolute humidity is an index of the combined temperature and moisture of the air and so may well affect the extra-corporeal life of the vibrio.

In all places which show a high average cold weather rate for cholera the absolute humidity is over 0.400, while in all areas which have a low average cold weather rate the absolute humidity is below 0.400.

Rogers believes that the atmospheric condition which favours cholera epidemic is high absolute humidity of the air.

The important question of endemic areas is discussed. Lower Bengal, Orissa and Assam constitute a hyper-endemic cholera area, the lowest annual rate never falling below one-tenth of the average rate for thirty years; in this area the absolute humidity never falls below 0.400. There are three other areas in which cholera has never been completely absent for one year during thirty years; these are—

(1) Behar, Chota Nagpur and part of the United Provinces.

(2) The low-lying districts of south-east Madras.

(3) A small low-lying strip of the North Konkan districts of Bombay.

All of these areas show an absolute humidity of over 0.400 throughout the year.

Rogers does not agree with the popular view that Lower Bengal is the one great home of cholera from which epidemics spread over the whole of India. He agrees that the 1817-19 epidemic spread from Bengal and that several others have also originated in that province, but he shows that exacerbations of the disease have been more frequent in some areas which are far distant from Bengal than in others which are nearer. He therefore inclines strongly to the view that there are other endemic areas besides Bengal. Jhansi, for example, showed eighteen epidemics in thirty years, having been invaded not only from the adjoining divisions in the United

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Provinces but also from the Central Provinces. The great outbreak of 1875-77 illustrates this point, it appears to have originated in three distinct endemic areas—

(1) In the eastern sub-Himalayan divisions of the United Provinces in February and March 1875.

(2) In Nasik near Bombay in March 1875.

(3) From Tanjore in Madras in April 1875.

Pilgrim movements played a great part in spreading this devastating epidemic.

An important factor in predisposing to this outbreak was the previous prolonged deficiency of rainfall and the resultant famine conditions. In nearly all the other epidemics which have been studied, there was also a previous long spell of deficient rainfall. Several examples are given to show the well known importance of pilgrim gatherings in spreading the disease. The important factors in the spread of cholera thus appear to be

(1) High absolute air humidity.

(2) Preceding deficient rainfall.

(3) The introduction of infection, especially by returning pilgrims.

Rogers believes that it is possible to predict an epidemic and to prevent it by the compulsory inoculation of pilgrims as well as by the other sanitary precautions which are at our disposal to prevent pilgrim gatherings from being "cholera exchanges."

Altogether this paper is one of outstanding importance, it is worthy of closest and most critical study by all who are engaged in the work of cholera prevention. Some of the points which require further investigation are (1) Granted that high absolute humidity of the air is essential to the development of an epidemic, how does this affect the extra-corporeal life of the bacillus? If the organism is water-borne the air conditions would not be likely to influence the life of the vibrio. If flies and hand contamination play the most important parts in the spread of the disease, atmospheric conditions might well influence the sustained life and virulence of the vibrio outside the body and it ought to be possible to carry out experiments on this point. In these, natural conditions should be simulated as closely as possible. (2) Rogers strongly hints at individual susceptibility as being an important factor; he refers to the complete absence of the disease for a previous period as preparing the population for an outbreak, and he indicates that a great epidemic is followed by a period of mass immunity. (3) Another point of importance is whether climatic conditions affect the individual resistance to infection in the same way as happens in the case of infection by *Entamœba histolytica*.

It is to be hoped that Sir Leonard will be able to continue his important studies and to include a comparative analysis of outbreaks which occur in cold climates. The whole subject is highly complicated and difficult. This paper is not the last word, but it is a very weighty one.

IS EPIDEMIC DROPSY AN INFECTIOUS DISEASE?

THE very interesting paper by Dr. Anderson in this month's issue brings into prominence the question of infection in epidemic dropsy. Any disease in which individuals belonging to closely associated groups of people are attacked in rapid succession is naturally regarded as being likely to be communicated from person to person and so it becomes necessary to investigate rather closely the conditions under which the disease occurs. Epidemic dropsy shows a striking tendency to affect a number of people who are closely associated with each other and for some years it was almost universally accepted as being a communicable disease. Evidence gradually accumulated which resulted in a complete change of opinion on this point and there is now a very large volume of evidence which goes to show that ordinarily the disease is not communicated from person to person, but affects a number of persons who are exposed to some common influence. Dr. Anderson states the facts which have come under his observation in a clear and judicial manner and it is likely that the majority of our readers will be convinced of the truth of his conclusions with regard to the Kalna outbreak.

The Kalna outbreak was peculiar in two respects, the first and most important being that it occurred soon after the arrival in Kalna of persons suffering from the disease. There had been no epidemic dropsy in Kalna previously and the disease affected none but those who were in close contact with patients. It is true that there were cases of epidemic dropsy at Nawadip which is a few miles away from Kalna; these occurred about the same time as the Kalna outbreak so that Kalna must be regarded as being within the endemic area of the disease. It would, however, be a very remarkable coincidence that the very people who came into contact with the imported patients should be the ones to be attacked and it is much more likely that there was a true association between the outbreak and the importation of the disease. There are only two likely explanations.

(1) That person to person communication of the disease actually occurred: if so, this is a very remarkable occurrence and one which is contrary to the usual experience that the affected persons who go to a non-endemic area do not convey the disease to others.

If infection actually occurred as is suggested by the reported facts, we must regard infection as being a possibility in spite of its rarity.

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(2) That the imported patients brought a supply of rice with them and shared it with their personal friends, who thus became attacked. If this had happened, it is hardly likely that it would have escaped the observation of Dr. Anderson who made very careful enquiries into the circumstances connected with the outbreak.

It is interesting to note that the Kalna outbreak was of the usual explosive type, twelve out of the eighteen patients being attacked within eight days and all the fresh cases within less than six weeks. All the fresh cases occurred among people who obtained their rice from one shop, but many others who also bought rice from the same shop escaped. Dr. Anderson failed to find evidence that one sample of rice could be responsible, and altogether his record is rather strongly in favour of the possibility of a poison being produced in the intestinal tract of persons who became infected with a special organism. This is a possibility which we have always kept under consideration, but all the observed facts in connection with many observed and recorded outbreaks are opposed to the view that this is a common occurrence. It is only by the accumulation of such observations as those made by Dr. Anderson that a true understanding of the causation of the disease can be reached. Meanwhile the broad facts remain as before, the disease as a whole is best explained as a rice intoxication, and while it is quite possible that in exceptional cases the poison may be formed by microbic action on the intestinal contents, it is more usual for the poison to be pre-formed. In any case the rule that rice should be cut out of the diet is the proper one to follow and there is abundant evidence to show that any outbreak can be controlled by withholding rice.

Dr. Anderson's paper is a valuable contribution to the subject and the evidence produced by him must be carefully weighed by anyone who wishes to arrive at the truth regarding epidemic dropsy.

The clinical manifestations were those of a fairly mild outbreak.

SPECIAL ARTICLES.

GYNÆCOLOGY AND OBSTETRICS: A PRACTICAL SURVEY OF RECENT AUTHORITATIVE OPINIONS.

By V. B. GREEN-ARMYTAGE, M.D., M.R.C.P. (Lond.),
LIEUT.-COLONEL, I.M.S.,
Professor of Gynæcology and Obstetrics, Medical College, Calcutta, and Surgeon to the Eden Hospital.

Sterility, or the inability to conceive, is relatively common in human beings, as compared with lower animals, and it would seem that with the ever-increasing lateness of marriage the reproduction rate must fall, due to causes in the woman or the man.

One of the greatest advances in gynæcology in recent times has been the introduction of the Rubin method of testing the patency of the Fallopian tubes in those cases where the explanation of sterility hitherto was unrecognisable. If there is a block in the canal from the uterus to the fimbria on three separate occasions, with the uterus in the normal position, operative procedure is not likely to benefit the patient. If the uterus is retroverted and symptomless and the tubes are patent no operation is indicated, but if the tubes are only patent after first anteverting the uterus, the probabilities are that the retroversion is causing a mechanical kink. Then a modified Gilliam or Williamson operation is advisable.

Complications of Pregnancies.

Heart Disease.—It must be remembered that many cardiac patients do not show any symptoms until after labour.

Out of 38 cases of heart failure after labour, 5 died in hospital during the puerperium, and 8 more died within the year; 6 with mitral stenosis died immediately after labour. Myocarditis is the worst complication of all. It must be realised that disturbances in heart function are not due to mechanical factors, for 40 per cent. occur during the first three months of pregnancy. The fault lies in the increased demand on the heart muscle made by the increased blood volume. No hesitation should be felt in inducing labour if there are indications that the heart is going to fail. If failure has occurred, no interference with the uterus is permissible.

Tuberculosis.—Much discussion has occurred on this subject. Some are absolutely against terminating pregnancy, others are for doing so. The middle and the wisest path would appear to be that if there are active signs of the disease, and the patient is under fifteen weeks pregnant, the uterus should be evacuated. The most important point is often overlooked, namely—the future of children born of tubercular mothers, for it has been proved by careful statistics in England and France, that more than 40 per cent. of such infants die within the first year of life, even where segregation has been compulsory. This being the case, it is not difficult to understand the enormous infantile mortality in the large cities of India, where education and the benefits of segregation have not as yet penetrated.

Pernicious Anæmia of Pregnancy.—The problem of this disease, rare in the West, and exceedingly common in India, still remains unsolved. It is most often encountered in multiparæ, and may date back to the very beginning of gestation. At times there is diarrhœa, in most patients there is some fever and slight albuminuria; epistaxis, and retinal

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hæmorrhages are common. It is thought that the various lipoids found in the blood of pregnant women are a causative factor. There are four possible terminations—(*a*) death during labour (which is premature in 90 per cent. of the cases); (*b*) death a few hours or days after delivery; (*c*) death weeks or months later; (*d*) very rarely, a rapid cure after delivery, with a return of the blood picture to normal.

The treatment of choice is direct blood transfusion, and early evacuation by tents in the early months of pregnancy. *X*-rays to kill the fœtus have been employed in recent years, and then the gestation is left to nature to abort.

An interesting point is that the blood of the infant, if born alive, is quite normal.

Post-Maturity.—The dangers of this condition have been stressed again and again. Ten days after the full term date is the maximum period beyond which it is unwise to wait for the onset of labour. Provided there is no disparity between the fœtal head and pelvis, medicinal induction of labour is first indicated. The castor oil-quinine technique for induction is successful in over 70 per cent. of cases, and is particularly useful in cases of accidental hæmorrhage, and marginal or lateral placenta prævia, for many of these cases when first seen are in a condition of temporary comfort, following a smart hæmorrhage, or exhibit a constant slight loss, which continues for some time. Here the uterus is contracting irregularly and at long intervals, or not at all, and there is little or no dilatation of the os. The castor oil-quinine technique, with or without the additional use of pituitrin, is attended with such success in these cases, as to negative to a large degree, any other interference, thereby decreasing the risk of sepsis. In post-mature or other cases, where the medicinal method of induction fails, if bougies or the stomach tube be introduced within twelve hours of the last dose of quinine, strong labour pains commence.

During the last year many articles have appeared urging induction of labour rather than Cæsarian section in those borderland cases of disparity, when either the pelvis is on the small side, or the baby big, because the risks of induction in properly chosen cases are infinitesimal. The whole question resolves itself into the proper application of ante-natal care, for the incidence of fœtal death and maternal morbidity would be very greatly reduced if every pregnant woman was examined conscientiously in her 37th week. If there is definite overlapping Cæsarian section obviously is indicated, but if the head can engage and the outlet is normal, in a primipara or one who has had previous difficult labour, a frank explanation of the advantages of induction and its negligible risks to the mother is undoubtedly the wisest course. However, it is well that the practitioner should remember that there is considerable danger attending the use of forceps in delivering premature infants, especially in posterior positions.

Non-Dilatation of the Os is one of the commonest causes of anxiety in labour, but if the membranes are intact, beyond the weariness of waiting, there is no need for anxiety, either as regards the mother or the child. But it is a very different matter if the membranes have ruptured, for in the writer's experience, if the pelvis is normal, in the great majority of cases this spells a posterior position, that is non-flexion, non-rotation, and therefore inability to descend.

These cases of non-dilatation of the os are common, and among the most difficult ever met with. What is best treatment? The rectum should be emptied, and hot vaginal douches given every four hours. First try morphia $\frac{1}{4}$ gr. and 1|100th gr. scopolamine, and repeat with 1|400th gr. of the latter every hour for three doses. If there is no progress, give 25 grs. of chloral and 40 grs. bromide, repeating in four hours.

If the labour has already lasted two or three days, or the above methods fail, you must bear in mind that the woman is in a state of exhaustion, the chances of delivering a live baby are practically nil, and that the case will become septic. Therefore it is best to perforate the head and allow the brain matter to escape. A cranioclast is then applied to the head and a weight of 4 lbs. is attached to the handle of the cranioclast, and made to hang over the end of the bed. The patient is now left alone. In the course of a few hours the cervix will dilate and the baby be born. The advantages of this method are that the risk of post-partum hæmorrhage is minimised, and there is no tearing of the cervix or perineum.

Intracranial Birth Injuries.—It is now generally recognised that cranial stress depends on two main features:—(1) The outside pressure to which the fœtal head is subjected. (2) The degree of congestion of the cerebral veins and sinuses. Post-mortem evidences of cranial stress are tears of the tentorium, marked engorgement of the vessels of the pia mater, choroid plexus and great sinuses, with or without intracranial hæmorrhages. It is suggested that tears of the tentorium are a sign not so much of undue force exerted upon the head but that this force has been exerted in the wrong diameter, viz., the occipito-frontal: intracranial hæmorrhages are due to intense venous congestion or the stress of delivery. It has been noted that when forceps have been applied to the fully flexed head, the damage and death incidence is greatly reduced.

Ante-Partum Accidental Hæmorrhage.—Fitz-Gibbon, from the statistics of the Rotunda Hospital, observes that this condition is much

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more common in multiparæ than primiparæ; for instance, out of 115 cases 99 were multiparæ and 16 primiparæ. Considering the fact that *ante-partum* hæmorrhage is nowadays generally conceded to be of toxæmic origin, it is remarkable that the severest type of toxæmia, namely eclampsia, is far more frequently seen in primiparæ. Therefore it must be assumed that the type of toxæmia is different in each case.

He considers there are two types of *ante-partum* accidental hæmorrhage totally unconnected, one a simple and truly accidental ablation of part of the uterine wall, involving the placental site, in common with the rest of the uterus.

In this type it may be that there is low implantation of the placenta, but as the placenta cannot be reached these cases are not diagnosed as placenta prævia. The only symptom is external bleeding, the fœtus is not affected, and the mother remains well. These cases can be terminated by any of the recognised slow methods of induction of labour. In another variety of this type, due to injury or fall, or traction on the cord, there may be bleeding between the placenta and the uterus, with clotting of the blood, and the extrusion of sanious serum from the cervix. The urine is free from albumin, and the fœtus may be born alive and healthy, according to the extent of the hæmorrhage and the time of onset of labour.

In the second or toxæmic variety, these are all multiparæ, and all have albuminuria, for the mother is suffering from chronic interstitial nephritis. Recurrence of pregnancy throws a culminating strain on the kidneys, and results in a subacute exacerbation of the nephritis. There is degeneration of the connective tissue between the muscle fibres, and a extravasation of blood into this tissue between the muscle fibres and an oozing of blood into the cavity of the uterus. The degeneration occurs all over the uterus, under the peritoneum, and in the decidua.

In such patients the commonest symptom is a sudden gush of external bleeding which is dark red in colour, the urine is scanty and albuminous and the patient obviously very ill. The fœtus as a rule is dead.

Fitz-Gibbon demonstrates very clearly from his own results and the published reports of other hospitals that the accepted teaching of plugging the vagina or Cæsarian section for these severe toxæmic patients with apoplectic uteri is erroneous, and based on a wrong appreciation of the pathology of the disease. He advocates that those patients that are in labour should be allowed to complete delivery without interference, but if the uterus is tense or painful or the patient in profound collapse, only puncture of the membranes should be performed. The patient should be kept warm, and saline 9 ozs., glucose 1 oz. given three hourly, per rectum. Water by the mouth is given freely, and if need be, 10 to 20 ozs. of saline with bi-carbonate of soda injected into the vein. Pituitrin before delivery has little effect, but given immediately after delivery it is useful in order to anticipate possible *post-partum* hæmorrhage. The placenta is usually followed by masses of old hard black clot, demonstrating the origin of the disease. He states that operative interference, e.g., version, plugging, Cæsarian section, have hitherto been the direct causes of the enormous mortality, whereas the adoption of the above treatment of masterly inactivity has reduced the mortality to under 15 per cent. during the last five years at the Rotunda Hospital, a very striking testimony to the correctness of his teaching.

Preventive Medicine as applied to Obstetrics.—In England during the last decade the importance of preventive medicine as applied to the pregnant woman has received official recognition, and the responsibility thereof has been vested in the public health authorities. As a result an ever-increasing number of ante-natal clinics have been established.

The common disturbances of pregnancy commence very early; therefore it is all important that women should receive expert advice from the earliest date possible, for the ovum in its growth and maintenance is a parasite, not only drawing on the mother's capital but actually injuring her in many cases by reason of the disturbances it produces in all the tissues concerned with metabolism and this malign process begins at the time of the imbedding of the ovum, when the tissues of the endometrium are digested, and destroyed by the trophoblast, and the end products are thrown into the maternal circulation.

Ante-natal care, in the sense of preventing gross errors is now generally understood and practised, but it is not sufficiently recognised that the diet of the pregnant mother, from conception to parturition, and from child-birth to the end of the lactation, is of immense importance in the prevention of disease in both mother and child.

The work of Cowell, Mellanby, McCarrison and others has indubitably proved that deficiency of vitamines in the pregnant mother not only diminishes her resistance to infection, but predisposes her to infection after delivery. Moreover, the fœtus suffers in its development *in utero*, and should the mother's milk be deficient, or her food scanty, or lacking in fat soluble vitamines A, D, and E, the infant suffers from marasmus and a general feebleness, which is the cause of a considerable proportion of deaths during the first month of life.

These facts are of particular application in India and should be borne in mind by every practitioner, for the strain of pregnancy on

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the metabolism is much greater in tropical countries; moreover, the tendency to toxæmia and infection is likewise greater. The writer has again and again during recent years advocated closer attention to the diet of the pregnant woman, both as regards the conservation of her own health, and that of her child to come. Therefore, at the risk of becoming monotonous, he desires to reiterate that the following diet for all pregnant mothers is recommended, with the addition if need be of cod-liver oil and Parrish's Food for anæmia or diminished calcium content.

Cereals.—Oatmeal porridge or any of the breakfast foods, with milk. Brown or wholemeal bread, toast, rusks, cream cracker biscuits.
Vegetables.—Any vegetable in any form except fried.
Fruits.—Any fruit, either fresh or stewed.
Meat.—Beef, lamb, mutton, veal, not at all; or only very occasionally. Pork never.
Curry never.
Chicken, (avoid duck, goose, or game).
Croquettes or rissoles, if not fried in deep fat.
Eggs.
Fish.—Any fish, except salmon, mackerel and hilsa.
Soups.—Any soup, thick or clear, but free from fat.
Sweets.—Any jam or jelly, marmalade or honey, but pure honey is best of all. Milk puddings. Boiled puddings occasionally. No pastry, no cakes.
Salads.—Any salad, but sparingly of salad dressing.
Fluids.—Water, ærated water, home-made lemonade, orangeade, weak tea, coffe, milk, as desired.
No alcohol of any kind. Butter may be taken if desired, but not in large amounts. Cream, fat meats, and any fish fried in deep fat should be avoided. Fruits and vegetables must be taken at least twice a day, and meat, if at all, not more than once every other day. Mild cheese, such as St. Ivel's is permissible.

It must be remembered that when there is deficiency of vitamines in the food, there is also a shortage of calcium, potassium, sodium, phosphorus, iron, and iodine, etc.

There is good reason to believe that a considerable part of the formidable array of disease, including lack of growth and vitality, that beset the child and adult in the East is caused by food deficiencies and there can be no doubt that there is widespread shortage of vitamines in the diet of the poorer classes, caused by ignorance, poverty and the refinement of food, over which they have no control. For instance the deficiency in vitamine B is mostly due to the refinement of cereals, that is the refinement of flour. The bread made of such flour forms 70 per cent. of the diet of the poor. Wholemeal bread contains seven times as much vitamine B as white bread, therefore it behoves everybody in India to eat wholemeal bread and to supplement the deficiency in vitamine B with dâl or eggs or ata.

Fresh milk and cheese are the foods richest in calcium, and when these are taken in any quantity there will be sufficient calcium in the diet, but it must be remembered that large numbers of poor children get very little milk. The body needs 9 to 15 grains of calcium per diem. A pint of good cow's milk contains 10 grains.

There is very little iodine in the food or soil of Bengal, the lack of which is frequently responsible for lowered and disordered metabolism. This can be made good by taking iodised salt, known as Iodosal, instead of ordinary salt at meal times.

Munro Kerr in a most excellent lecture advocates adequate hospital accommodation for all serious cases which have been primarily seen, in a well run ante-natal department. The importance of such supervision should be generally recognised in India, where the incidence of mal-positions, toxæmias, deformities of the pelvis, and puerperal sepsis is colossal. The writer lays particular stress on the better training of students in clinical midwifery, for the day after he qualifies the practitioner may be called upon to perform a serious obstetric operation which he has never done himself, or even seen performed. He suggests that one whole term of three months should be devoted to clinical obstetrics and gynæcology alone by every student, and that every general practitioner should undergo revision courses in a hospital every three to five years.

Before leaving the subject of obstetrics, the writer would like to refer to the very large number of cases of small round pelvis and contracted outlets that are seen in Bengal. Whitridge Williams considers the generally contracted pelvis to be a stigma of degeneracy, and he produces weighty evidence to corroborate his views.

It may help the general practitioner to remember that in 95 per cent. of all cases the transverse of the outlet corresponds with the distance between the posterior superior spines and if this measurement is less than three inches a difficult or tedious labour is certain.

Puerperal Sepsis.—A review of the recent literature of many countries indicates that the Hobb's treatment of the peurperally infected uterus by intra-uterine injections of glycerine has come to stay, and certainly the published results render it imperative that every practitioner should be conversant with the technique of this lymph drainage method. This has been given in full by the writer in the *Indian Medical Gazette* of November 1926, and it will be sufficient here to refer to the fact that it is very useful in certain cases of sterility, and of subinvolution or menorrhagia after abortion or miscarriage. But of still greater importance is its use in cases of acute puerperal sepsis, for it has not only diminished by one half the number of complications, but has reduced the mortality to one-third of the previous figure.

Phillips, in an address to the Royal Society of Medicine, demonstrated that before instituting this line of treatment, the average stay in hospital, over a period of three years, was

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41.5 days, whereas, since commencing lymph drainage with glycerine, it has been reduced to 26.2 days. He notes that all such treated patients suffer less from pain, and that there is a rapid improvement in the clinical condition, accompanied by a quick fall in the temperature and pulse rate.

Colebrook, working under the Medical Research Council, London, suggests that there is nothing remarkable in the circumstance that a certain number of parturient women become infected by the hæmolytic streptococcus considering that all wounds are infected with streptococci, and the dense overcrowding in our big cities.

He indicates that there is a natural resistance of women in and after labour, to combat all infection by means of a leucocytosis, and one practical suggestion of his the writer has found very useful, namely:—In all cases of difficult or interfered-with labour, he advises an immediate intramuscular injection of 2 or 3 c. c. of nucleic acid (Parke Davis & Co's Solution No. 1; 5 per cent.). Such an injection will double or treble the number of leucocytes in the circulation within 4 or 5 hours. He particularly advocates that in doing a blood culture bacteriologists should inform the clinician how many microbes there are per c. c. of blood, because this information is of considerable value in forming a prognosis. For instance, when only a few streptococci are found in the blood e.g. 1 to 10 per c. c., recovery is not uncommon, whereas if there are 40 to 50 per c. c. the prognosis is hopeless. Moreover, a series of such counts helps one to judge the effect of any particular line of treatment adopted. Colebrook's experience, like ours in India, is that the worst cases of puerperal sepsis are those in which the lochial flow is completely suppressed. For this reason he is of the opinion that the lymph drainage method of Remington Hobbs is a notable advance in the treatment of these infections.

He does not advocate injecting antiseptics into the blood stream for these "internal disinfectants" fail in the crucial test, viz:—their power to confer upon the patient's blood the capacity to kill more microbes than it had before they were administered.

Laboratory research however indicates that there are two measures which may be helpful, namely, blood transfusion, and the use of arsenical drugs of the neo-salvarsan type. It is indeed melancholy, that blood transfusion in India is so unpopular for Major Lloyd, I.M.S. in Calcutta has ably demonstrated its feasability and ease of technique. The writer's experience fully bears this out.

The reason why novarsenobillon (given in one dose only 0.6 gm.), offers more hope of success in the treatment of puerperal septicæmia, is that after its administration the blood serum of actual patients has been proved to have a largely increased power of killing hæmolytic streptococci.

Gynæcology.

Myomectomy, as an alternative to hysterectomy, is receiving more and more attention, particularly in those cases where the presence of fibroids has possibly inhibited pregnancy. The indications lie within the child-bearing period provided that anæmia is not too severe, and that the fibroids are not so numerous or so troublesomely situated that myomectomy is physically impossible, or at least injudicious on account of the inevitable shock.

Women have a rooted and quite natural objection to hysterectomy, therefore whenever possible myomectomy should be done. The ideal incision is an anterior one, combining it with the tunnel method of Bonney. The endometrial cavity has to be opened in many cases, but this need cause no anxiety. The chances of pregnancy occurring after myomectomy under the age of 38, taking the published reports of four surgeons, are roughly 1 in 4.

The writer having done a considerable number of these operations, has come to the conclusion that although at the end of operation, the uterus looks remarkably queer in shape and size, functional capacity is unimpaired. Two cases he lost after extensive removal of fibroids, one from shock, and the other from hæmorrhage. The advent of Bonney's clamp has now however robbed the operation of many of its past dangers.

Hæmorrhagic ovarian cysts are of great interest to the operating gynæcologist but of greater importance to the practitioner, for they are not uncommon, and are the cause of those frequent cases of dysmenorrhœa and dyspareunia coming on some years after marriage. These patients, between the ages of 25 and 45, have never had in their lives anything in the nature of pelvic peritonitis, and yet when examined one finds some indefinite nodular swellings on either side of, or behind the uterus, which are indistinguishable from similar swellings due to old salpingo-oophoritis. But these women have no history of any acute illness.

Hitherto, such cases have been regarded as chronic tubo-ovarian masses of inflammatory origin, and many of them have been neglected under this assumption, with the result that the tumour slowly grows, and may invade the rectum, and cause perforation. These hæmorrhagic cysts owe their origin to the retroperistalsis of endometrial tissue through the tubes into the peritoneal cavity and having reached this cavity, the endometrium, with its glandular element grafts itself on to the front or back of the uterus, the peritoneum, the ovary, or rectovaginal space. This graft is an unencapsuled growth, and forms small

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cysts containing chocolate like material which is degenerated menstrual fluid. As the endometrioma each month increases in size by virtue of its secreting function, it infiltrates the surrounding tissues like a malignant growth, without, however, showing other signs of malignancy, in the form of metastatic growth, or recurrence after removal.

It is this infiltration of structures in the pelvis particularly which makes removal so difficult, for the endometrioma may penetrate the bladder, vagina, or rectum.

Donald, Bailey, and Sampson have demonstrated that endometrium is the invariable constituent of these tumours, and have shown that each tissue will react in a different manner to the growth of endometrium, according to its own structure, for instance, endometrium may be implanted in the parietal muscles after ventrofixation or myomectomy, and then excite muscular fibrous reaction with the formation of a tumour which becomes encapsuled.

In the ovary, on the other hand, as there is no muscle, there can be no reaction of a muscular type, but the endometrium stimulates menstrual function in the formation of cysts: Stevens has suggested that in some cases these displaced fragments of endometrium may give rise to primary malignant growths of the ovary.

Treatment:—As these morbid tumours must have existed from time immemorial in women, it is probable that many undergo spontaneous cure with the natural cessation of menstruation, when the uterus and the ovaries atrophy at the menopause; but if the symptoms are severe and invalidism great, it is not possible to wait for a natural cure. for the tumour may, in the meantime, by virue of its infiltrating capacity endanger life: therefore early surgical removal offers the best means of curing these patients of their pain and discomfort.

The technique of any operation must primarily aim at removal of both ovaries with extirpation of the endometrioma if possible, short of injuring bladder or rectum. These operations are always difficult, owing to the dense adhesion of the ovaries, and the fixation of the rectum to the lower part of the uterus makes hysterectomy sometimes impossible. In five recent cases, the writer was only able to perform supra-vaginal hysterectomy, together with removal of both ovaries and their hæmorrhagic cysts (endometriomata).

The argument against the removal of both ovaries in possibly young patients, carries no weight, because these patients are already sterile, when both ovaries are mere blood-sacs adhering to the back of the uterus or broad ligament; moreover, so far as is known, no lesser conservative operation will cure the patient of her symptoms or prevent recurrence. In those cases where operation is refused, or perfect removal is impossible, the application of radium to the uterus, or *x*-rays to the ovaries, will cure the patient by annihilating the menstrual function, but it must be remembered that electro-therapeutics leave the patient with adherent ovaries and widespread adhesions in the pelvis, which may in themselves be a source of danger later, from intestinal obstruction, chronic invalidism, or discomfort from rectal or vesical pressure.

Varicocele of the Broad Ligament, either of primary nature, or secondary to disease of the uterus or adnexa, has come in for considerable discussion in recent years, and the writer's experience bears out in full the findings of Fisher and Castano, for there is no question that women with this condition tend to drift from practitioner to specialist, and from specialist to quack, because the pathological cause of their symptoms cannot be readily diagnosed. The most common complaint of these women is continuous pelvic pain with rectal and vesical tenesmus immediately before the menstrual periods, which are invariably excessive. Following the periods, there is often a profuse watery leucorrhea, and a "peculiar permanent voluptuous sensation," due to congestion of the plexus of veins around the clitoris, which cannot be readily satisfied, owing to the deep pain during coitus. Physical examination may indicate nothing more than a bulky uterus, possibly displaced, with congested ovaries. The type of patient is the hypothyroidic one. These women haunt continental Spas, and no doubt are benefited by Plombières treatment, but the only real successful treatment is excision of the varices in each broad ligament, exactly as one would deal with the same condition in man.

Many of these patients, because of this voluptuous sensation, practise masturbation, and drift into a state of acute neurasthenia and melancholia. They are by no means uncommonly seen in this country, as is readily understood when one bears in mind the lack of tone of the pelvic muscles and the static pelvic hyperæmia of so many women in the tropics.

The writer has seen many of these cases, and before advising operation, usually suggests the recumbent position with the foot of the bed raised at nights and for four hours during the middle of the day, combined with cold water vaginal douching, and colon irrigation. The patient is instructed to carry out the Stacey Wilson pelvic muscle exercises, which are for the purpose of increasing the muscle tone of the pelvic diaphragm. In some cases the Hobb's intra-uterine glycerine treatment is very useful. Temporary pessary treatment with rubber ring or ball has not given any satisfaction, though some authorities have advocated their use.

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Prolapse.—Bullard has published a comparative study of the end results of all the various operations for prolapse of the uterus which are now performed. There are 361 cases recorded, and the operations were performed by 30 different surgeons and have been closely observed in the follow-up clinics of New York. The summary of this extremely interesting and arduous piece of work, carried out during the last ten years, are as follows:—

(*1*) that 95 per cent. of all cases of uterine prolapse are cured by vaginal plastic surgery, and that any failures of prolapse operations occur early.

(*2*) that vaginal plastic work, combined with ligament shortening from above, is satisfactory perhaps in cases of *slight prolapse*, but the careful fascial reconstruction *per vaginam* is undoubtedly responsible for the success.

(*3*) that all gynæcologists to-day have long since ceased to cure descent of the uterus by any form of suspension or fixation by the abdominal route. Careful reconstruction of the various planes of the pelvic fascia, that have become attenuated, over-stretched, or torn, is the *sine qua non* of the operative treatment of prolapse.

The pre-operative responsibilities of the gynæcologist are many, and in India the realisation of this is particularly important, as many of the patients have suffered long, and only extreme urgency of symptoms compels them to seek tardy relief. The writer, while recognising that local examination may take but a few minutes, would like to stress the importance of careful history taking, and a complete physical examination, not neglecting a renal function test, for arterial hypertension is nearly always associated with a subnormal renal function.

If the daily renal excretion of urea in India is less than 250 grains, a blood retention of nitrogenous waste products may be suspected. In this connection, the phenol-sulphophthalein test is a most useful indicator of the metabolic processes, as represented by the kidneys. In all elective operations, results would be considerably improved if for a week or ten days before operation every patient adhered to a salt free diet, ate no meat, and at the same time took, for not less than five days, an alkaline mixture containing bicarbonate of soda, potassium citrate, and glucose.

The essential cause of acidosis is an insufficient utilisation of carbohydrate, because of an inadequate supply of the carbohydrates themselves, or because of the inability of the body to oxidise them. Glucose has considerable value as a diuretic. It counteracts the endogenous destruction of body proteins and aids materially in maintaining renal function, therefore, in any severe post-operative acetonæmia, intravenous glucose is a great standby. It can be now obtained pure in 5 c.c. ampoules from Messrs. Burgoyne and Burbridge, ready to be added to sterile saline for intravenous injection.

The public and many practitioners have become imbued with the idea that *x*-rays and radium can benefit or cure all kinds of pelvic tumours. Nothing could be more erroneous, or in the interests of the patients more disastrous, for many pelvic tumours are associated with pronounced anæmia or inflammatory conditions of the adnexa, which in themselves are contra-indications.

Pyelitis is extraordinarily common in the East after operations. These cases can be guarded against or cured by massive doses of bicarbonate of soda and potassium citrate daily in large quantities of water, (not less than five pints per day), but occasionally the infection resists these measures, and then iodine may be useful. The solution is:—Pure iodine 8 grains, pure potass. iodide 8 grains, in 1 oz. of double distilled water: 10—20 drops, in 30 drops of double distilled water to be injected slowly intravenously once a day for three days. American surgeons, advocate the intravenous use of American mercurochrome, 1 c. c. of a 1 per cent. solution in 5 c. c. of saline, for 3 days. In India, it is no uncommon thing for a patient to present herself for operation with a history of previous *B. coli* infection. The writer has found in these cases that a week's full course of hexylresorcinol (Caprokol) is an efficient prophylactic, for it it would appear to protect the upper urinary tract from *B. coli* invasion. Practitioners should remember that it is a serious error to take a patient off alkalines while there is fever. The acid sodium phosphate and urotropin line of treatment is only to be given when the temperature is normal. Again, never inject vaccines—autogenous or stock—if there is high fever; to do so is to court disastrous rigors.

The Menstrual Function.—In the light of recent research, especially that of Wilfred Shaw, Marshall, Dixon and Beckwith Whitehouse in England; Novak, Allen and Frank in America; and Schroeder in Germany upon ovulation and the development of the corpus luteum, we must regard menstruation as an unfertile abortion of the non-pregnant decidua. Menstruation follows death of the unfertilised ovum, in other words, menstruation is the uterus weeping for the death of an ovum, and this death of the ovum is synchronous with retrogression of the corpus luteum.

Rupture of the ovarian follicle, about the 13th to 17th day of the menstrual cycle, with escape of the ovum and growth of the corpus luteum, initiates development of the premenstrual hypertrophy of the endometrium. Once the ovum is discharged, the duration of its life depends on its meeting and fusing with

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the spermatozoon; if it is not fertilised it dies, and the result is retrogression of the corpus luteum, and necrosis of the menstrual decidua, which is cast out. Therefore the old theory that the menstrual function is necessary for the conception of the ovum is a pure myth. This will be readily understood in India, where marriage is often consummated and pregnancy occurs before any menstrual lochia has appeared. Moreover, it is common knowledge that conception may occur during lactation, after the so-called menopause, and during pathological states of amenorrhea. Beckwith Whitehouse summarises the position as follows:—

"The analogy existing between the menstrual abortion, and abortion during the early months of pregnancy, is very striking, when the two processes are compared. In each, there is softening and dilatation of the cervix; in each uterine contractions are present, and in each there is subsequent expulsion of the necrosed decidua. Investigation of the discharge on the second or third day, after an early complete abortion, shows that it has much in common with the menstrual lochia. Menstruation is, in fact nothing more than the disorderly action of a disappointed uterus; or perhaps shall we say, of a disappointed ovum."

The association of the ovary with the accessory genital glands, notably the thyroid and pituitary, is of increasing importance. Virchow stated "woman is a pair of ovaries, with a human being attached, whereas man is a human being, furnished with a pair of testicles." But evidence is accumulating that the ovaries are but a single link in the mechanism responsible for the metabolic rhythm of the adult female.

It is probable that the thyroid initiates the maturation and rupture of the first ovarian follicle, and is therefore responsible for the first menstruation and development of the first corpus luteum, with the institution of the sex cycle. This cycle, intimately associated as it is with variations in the basal metabolic rate (Wakeman, Heilig and Bond) testifies to the wisdom of Blair Bell's dictum "propter secretiones internas totas, mulier est quod est" (her internal secretions make a woman what she is).

Beckwith Whitehouse groups all pathological uterine hæmorrhages under four headings, which respectively convey a definite pathological entity.

1. *Epimenorrhœa*, or too frequent periods, is the clinical manifestation of a hyperactive state of the sex complex. It means that the ovaries are working at too high pressure, and producing ova of too low vitality, with the natural result of frequent menstrual abortions. This is the condition so frequently present shortly after matrimony, and so common in India during the cold months. Curettage for such a condition is of course useless, for the ovaries are hyperplasic and often polycystic. Epimenorrhœa also occurs at the end of sexual life, when the sex rhythm tends to become disordered. It has been suggested that therapy directed towards inhibition of the accessory sexual glands, e.g.—*x*-rays to the thyroid, is the best method of treatment, but this treatment has its dangers.

2. *Menostaxis*, or prolonged periods, which last from seven to twelve days or longer. The symptoms do not occur with every period, but often there is a history of several prolonged periods in the same patient. It is thought that the corpus luteum is associated with this type of hæmorrhage; although curettage frequently cures the condition, clinical experience, shows that recurrence of menostaxis is very common; and which vaginal hysterectomy or radium may be necessary.

3. *Menorrhagia*, or flooding, is merely a severe menstrual hæmorrhage, due to what may be termed uterine insufficiency, and is associated with chronic subinvolution, and changes in the uterine wall related to chronic metritis. In exceptional cases, it may be due to the uterine insufficiency of adolescence. This is a serious condition. Curettage is of only temporary use, and although thyroid radiation has been recommended, it is probable that intra-uterine application of radium is the best therapeutic measure short of vaginal hysterectomy.

4. *Metrostaxis* is the term used to include all hæmorrhages independent of the menstrual cycle. In this condition, the hæmorrhage is severe, and bright red with frequent clots. The endometrium is hyperplasic and almost polypoid. Beckwith Whitehouse considers that the problem of metrostaxis will not be completely understood until more is known of the innervation of the uterus, and the function of the autonomic nervous system, in so far as it controls the internal genital organs, possibly through the thyroid gland.

It is not surprising that the endometrium should be particularly susceptible to outside influences, when the embryonic nature of its structure is taken into consideration. "The uterus," as Cullen wittily remarks, "is an organ upon which many tunes are played." We have therefore, as clinicians, to bear in mind not only the instrument, whether it be good or bad, but to direct our attention to the technique of the artist, and to remember that a woman may possibly blush with her uterus as well as with her skin.

The conclusions of Professor Whitehouse, are as follows:—

(1). Menstruation is the monthly abortion of the decidua of an unfertilised ovum.

(2). The menstrual discharge is the lochia of an unfertile abortion.

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(3). The premenstrual endometrium is the menstrual decidua, and its development and life are dependent upon the corpus luteum.

(4). Menstrual abortion is initiated by the death of the unfertilised ovum, and retrogression of the corpus luteum.

(5). Epimenorrhœa is the clinical manifestation of hyper-activity of the sex complex.

(6). Menostaxis is an incomplete unfertile menstrual abortion.

(7). Menorrhagia is the result of uterine insufficiency, which may be (*a*) developmental (*b*) inflammatory, (*c*) degenerative. This insufficiency may be associated with lesions in (*1*) the metrium, (*2*) the endometrium.

(8). Metrostaxis is the reflection of outside influences upon the uterus, commonly associated with functional hyper-thyroidism, and hyper-sensibility of the sympathetic nervous system.

(9). Estimation of the blood tolerance of sugar, and the basal metabolic rate provide valuable data in the investigation of uterine hæmorrahge, especially at the time of puberty and the menopause.

A SHORT ACCOUNT OF THE WELSH MISSION HOSPITAL, SHILLONG, AND A RESUMÉ OF ITS WORK.*

By H. GORDON ROBERTS, M.D.

I HAVE great pleasure in responding, although with much hesitation, to your very kind suggestion that I should give some account of the history and work of the hospital with which I am connected.

The history of the Mission Hospital in Shillong differs, I suppose, but little from that of many similar institutions. What impressed one most when first coming out to India was the extreme unwillingness of the sick to become hospital in-patients. We were given to understand by those who spoke from experience that the sick in India, as a rule, much preferred to attend an out-patient dispensary than to become in-patients of a hospital ward. While enthusiastically supporting the case for the fullest development of out-patient work, we were deeply impressed by the necessity for making adequate in-patient provision in order to secure the best results in many cases.

Our work began in a two-roomed cottage and the beginning was a very small one. We received very great encouragement and help, in planning the new hospital, from Lieutenant-Colonel Innes, I.M.S., the present Inspector-General of Civil Hospitals, Assam, who was at that time the Civil Surgeon of Shillong. During the war, the building operations were slowly carried on. It was only after building for some time that one realised how much money would be required if the work was to be satisfactorily completed. Backed by a generous capital grant from the Government of Assam, which was given on the strong recommendation of Colonel Sir H. E. Banatvala, I.M.S., who was the Inspector-General of Hospitals at that time and to whom the hospital is greatly indebted, an appeal was issued to the friends of the Mission in Wales for the sum of £20,000 with a view to the completion of the scheme and the provision of the nucleus of an Endowment Fund, and in response over £30,000 was given. The contributions very largely took the form of endowments of beds and cots. While home on furlough we received very valuable help from the Commissioner of Housing for Wales who gave freely of his time and expert advice and helped us to secure electrical and sanitary equipment on the most favourable terms.

In March 1922, the Hospital was opened by His Excellency, Sir William Marris, Governor of Assam. He offered the best wishes of Government on the new venture and inaugurated a Fund in India to which he contributed Rs. 5,000. Comparatively little headway was made during the eighteen months following the "Opening Day." It may be of interest if I now mention briefly some of the features of the hospital.

Buildings.—The main building consists of two medical wards, two surgical, and a large maternity ward; this latter is a recent provision. In addition there are eight private wards, consulting rooms, with special eye, nose and throat room, together with a large dispensing room, laboratory, and out-patient's dressing rooms.

Entirely separate from the main building is the "Annexe" which contains four wards. Special attention has been given to proper and adequate ventilation; hot and cold water pipes throughout, including modern

Photo 1.—The Khasi Hills Welsh Mission Hospital, Shillong.

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*A paper read at the annual 1926 meeting of the Assam Branch of the British Medical Association, and re-printed from its *Proceedings* by kind permission of the President and Council of the Assam Branch, B. M. A.

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baths, etc., have been fitted, so that nothing may be lacking to promote cleanliness. The hot water supply is obtained from two boilers, the larger of which is capable of an output of about 300 gallons per hour.

Septic Tank.—This provision has been laid down on modern lines and includes frequent manholes. Numerous "sanitary" latrines and five "modern" bed pan flushing sinks serve the septic tank.

Lighting.—The hospital and its adjoining buildings are lighted throughout with electricity, and, in this connection, it is to be noted that the whole of the electrical installation including the erection and setting up of two engines and power-house has been done by Khasis, as indeed has been the case with the whole of the scheme with the exception of the sanitary installation.

Laundry.—This work is all carried out on the premises and not by "dhobies" as is the usual custom. Special provision has been made for the proper soaking and boiling of hospital linen. Electric ironing can be done when required.

Operating Theatre.—No reasonable expense has been spared to make the operating theatre as up-to-date as possible. It is supplied with the usual fittings and the various sterilizers are all worked by electricity from the 60-cell hospital battery. There is an adequate number of instruments for general and special surgery. The heating is secured by hot water pipes and movable electric radiators.

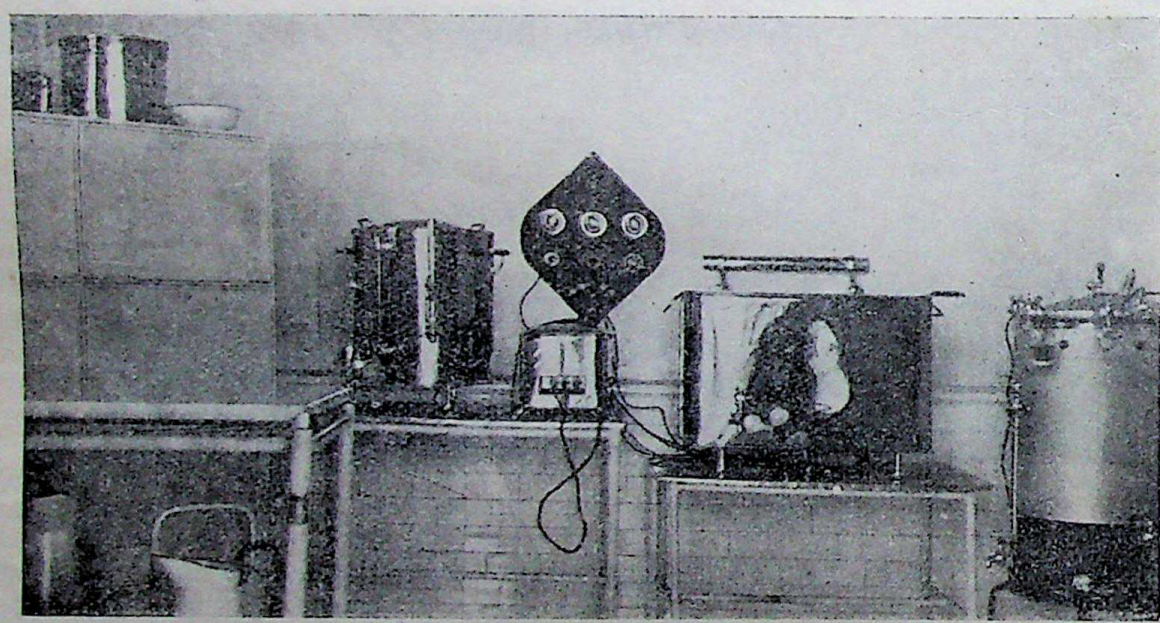

Photo 2.—Electric Sterilising Room.

X-Rays.—Two machines have been installed. The larger is a high-tension transformer which has considerable penetrating power and gives very satisfactory screen illumination. The smaller is used for therapy and as a spare.

In addition a certain amount of electrical apparatus has been installed and it is hoped that before long the diathermy and high-frequency apparatus already provided will be in proper working order.

Nursing Arrangements.—The initial provision of one European sister being insufficient, a second sister was appointed and it is anticipated that the number will be increased to three at an early date.

The hospital was opened with 4 to 5 Indian Christian nurses under training. The progress of the work has necessitated a marked increase in their number, which now stands at about 40. They are drawn from various parts of the Khasi Hills and at the present moment there are also three from Lushai.

We hope that they will be of considerable value in the various districts from which they come on the completion of their training. Speaking generally, they are wonderfully efficient and reliable. As an instance it may be mentioned that the operating theatre is almost entirely in the hands of the Indian nurses who are able to prepare for the larger major operations. Quite recently in the temporary absence of the European sister three gastro-jejunostomies were performed with no other assistance than that of two or three Indian nurses who did exceedingly good work. Their ward work is uniformly reliable and they keep the various chart records in a most trustworthy manner. The arrangements provide for day and night nursing and include three shifts in every 24 hours. The nursing course is for a period of not less than four years and includes maternity training. A written and practical examination is held at the conclusion of each year's work. The results so far have been most encouraging.

It is worth noting that the supply of nurses is greater than the demand. Girls of quite good family are becoming increasingly anxious to enter the nursing profession. All bed pan and other attendance is rendered by the nurses, and the sweeper (we only need one for the whole hospital) is not ordinarily required to enter the wards which are cleaned by the ward maids as at Home.

The hospital as originally planned was intended for and is being chiefly used by the people of the Khasi Hills. We are, however, very glad to find that the sick of some of the other hill tribes and of the plains are seeking admission also.

Furthermore, in response to a demand from the European community, a European block has been erected and is at the present moment being extended.

Maternity Ward.—This is the most recent addition and it promises to meet a very real need. An up-to-date labour ward has been added, capable of accommodating at least four patients, if necessary, at the same time. A beginning has been made with ante-natal work and it is hoped that there will be a big extension of this department before long.

Altogether the hospital contains about 110 beds, but the number of patients admitted during the summer months may be over 140.

The in-patients admitted during the past three years have been as follows:—

	1923.	1924.	1925.	Total.
Indians ..	513	768	857	2,138
Europeans ..	32	84	95	211
	545	852	952	2,349

A Resume of the Work.

It is exceedingly difficult to lay before you, in a clear and logical manner, the various results of the work and I crave your indulgence and generous forbearance while I try to touch on a few points which may be of some

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interest or stimulate discussion. As you are aware, the remarks made are based upon a very limited experience.

In turning first and quite briefly to the medical side of the work, I would like to refer to enteric fever. Prior to the opening of the hospital we were greatly concerned by the prevalence and heavy mortality of enteric fever. Things were so bad about 1917 that, when I was acting Civil Surgeon of Shillong, I assisted Major Knowles, I.M.S., who was then Director of the Pasteur and Research Institute, in a big campaign of "T. A. B." inoculation. Altogether about 2,000 persons voluntarily submitted themselves for inoculation, and if I am not mistaken such an extensive T. A. B. inoculation amongst the civil population was unique in India. The vaccine was so potent and inevitably so fresh that we congratulated ourselves that a very large percentage submitted themselves for re-inoculation. Enteric fever is still quite common in many parts of these hills.

An increasing number of the cases are now being brought to hospital and our figures shew a greatly reduced mortality as compared with the cases previously treated outside hospital. The nursing staff is protected by annual re-inoculation and so far has entirely escaped the disease.

In 1924, 21 enteric cases were admitted and 18 were discharged cured. Three died. In 1925, 43 cases were admitted and 38 were discharged cured. Five died. Almost without exception the cases that died were admitted late on in the disease. The almost invariable complication was hæmorrhage and if this occurred in a case that had been on full diet before admission a fatal result generally followed. Nearly every case admitted early in the disease recovered, and we attribute this result very largely to the nursing care, with constant day and night watchfulness and the careful prevention of any food being brought in by the patient's friends. One of the fatal cases was a European patient who was brought to us for laparotomy after she had perforated. It is the only case of perforation that we have seen in over 12 years.

B. Coli Infection.—You will all agree that we are exceedingly fortunate in being in such close proximity to the Shillong Pasteur and Research Institute. We have benefited immensely as a result of the extreme readiness of the various Directors to examine our numerous specimens and in particular we wish to offer our most sincere thanks to Lieutenant-Colonel Hodgson, D.S.O., I.M.S., for all that he has done for us during the recent past. It is only recently that we have discovered that *B. coli* infection is very widespread and we are realising the value of a cultural examination of the urine in many of our cases. A sudden and more or less persistent pyrexia immediately following a normal confinement attended in hospital; a sudden malaise with pyrexia and throat symptoms occurring perhaps three weeks after an otherwise uncomplicated gynæcological operation; a dull and unexplained pain persisting often in the left renal region may prove to be the recrudescence or persistence of an old *B. coli* infection. Almost all urines are examined on admission and suspicious cases sent for culture. We have had some excellent results following vaccine treatment and have great faith in it. Especially in the acute cases.

There are numerous other medical troubles to which I would like to refer but time will not permit.

Turning now to the subject which is uppermost in the minds of some of us, shall we glance at a few of the surgical possibilities of the work?

Electrolytic Chlorine.—After many years' experience of the more usual antiseptics which form a fairly heavy item in the drug bill we have been altogether won over to the almost universal use of E. C. Those who are familiar with the articles regarding E. C. which have appeared in the *Indian Journal of Medical Research* and the *Indian Medical Gazette* will know how indebted we all are to the indefatigable labours of Mr. C. H. Hutchinson. We use it in various strengths in every part of the hospital. It is invaluable in the out-patient department. We apply it pure as a compress to the skin on the day preceding all operations. It is again applied pure on the table. After application we carefully dry the skin with a sterile dab before making the incision as we do not care for its lymphogogic action in clean wounds. To all septic wounds it is applied in a strength of from 1 in 3 to 1 in 100 or sometimes much weaker. If used for flushing out joints we prefer to follow up with a second douche of ordinary saline. To refer to a recent case—a Khasi youth was admitted with an extensive incised wound of the knee produced by an axe. The patella had been divided longitudinally and the capsule of the joint widely opened. The above treatment was applied on admission (6 or 8 hours after injury) and the divided patella united with silver wire and the wound closed with drainage. The wound healed almost by first intention and the joint entirely escaped infection. For the hands in a strength of about 1 in 100 we use it for almost all our work. We would strongly recommend those who have not given it a trial to do so.

General Surgery.—All those who have any experience of the practice of surgery in this country will probably agree that it takes a considerable time to win the confidence of one's patients. Often the glint in the surgeon's eye seems to "signal" danger ahead to many a poor seeker after "medical treatment only." The secret we find is to go slowly and admit patients "for more careful examination." Our advice is "Don't put them in a ward in which other patients are just coming out of an anæsthetic." Moving very slowly from the time when we sometimes had to spend hours trying to get a patient to consent to an operation we have gradually attained to a much more hopeful state of affairs as is instanced by the words of a recent patient who said "Are you only offering me medical treatment?" We were assured when we first started work that there was very little surgery in the hills of north-east India. By dint of steady enquiry, in which knowledge of the language greatly assists, and patient investigation, we have discovered that there are far more surgical cases in the land than we had at one time supposed. Shall we again make brief reference from a small selected list? As you will agree it is not possible in a paper of this kind to go into much detail. Apart from the numerous minor operations the following operations were performed:—

1923	176
1924	198
1925	280
Total ..	654

Abdominal Surgery.—The work done under this head is gradually increasing:—

Abdominal sections performed in 1923 numbered	63
Abdominal sections performed in 1924 numbered	90
Abdominal sections performed in 1925 numbered	102
Total ..	255

It may be mentioned that the anæsthetics for all operations upon Indians and Europeans have been efficiently given by Khasi Sub-Assistant Surgeons attached to the hospital.

In 1925, 66 appendectomies were performed. Of this number—

(*A*) 17 were uncomplicated appendix disease.
(*B*) 15 were removed during the operation of gastro-jejunostomy.
(*C*) 34 were removed during various gynæcological operations, etc.

Fully 90 per cent. of the appendices removed under the heads B and C were definitely diseased.

The operations have proved beyond question that appendicitis is a very common trouble at any rate in the Hills. It is, however, much more common in its chronic

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than in its acute form. Obviously one does not wish to be dogmatic as to the etiology. One expects it most in cases of chronic constipation, and it appears to very readily follow an attack of enteric fever or dysentery. One wonders how far a liberal diet of pork and dried fish can influence it. We have had many cases of so-called "chronic dyspepsia" which have been cured or greatly relieved by the removal of the appendix. In some of these cases the barium meal shews stasis of the colon and often considerable ptosis.

We see quite a large number of tubercular abdomens, arisen from bands in the ileo-cæcal region following old appendix mischief. Some time ago a patient was admitted at midnight in intense abdominal pain and with complete obstruction. He gave a history of chronic dyspepsia but was otherwise quite fit until 4 p.m. on the same day. He was prepared for operation (our theatre equipment allows us to operate as easily by night as by day) and a laparotomy was performed. His condition was very grave and we were afraid that he might die on the table. Loops of greatly distended gut made investigation very difficult. Ultimately the obstruction was discovered near the ileo-cæcal valve where adhesions had arisen around a chronically inflamed appendix. The distension was so great that the gut had to be opened and emptied before the abdomen could be closed. To our surprise he made a straightforward recovery. We have had a fair number of cases of acute appendix trouble, chiefly amongst the tea-planting community. Government officials seem to be strangely immune!! Some time ago we had a case of very acute appendix in a European patient. She had suffered from chronic pain for about 25 years, in the right illiac region, which she had been told before she was married was of ovarian origin. When she was 47 the trouble suddenly lit up in the most intense manner. She reached us on the sixth day. Fortunately resolution started and so operation was postponed. It was six weeks before we dared venture to open the abdomen. It was the most difficult case that we have ever seen and the operation lasted 2¾ hours. Everything was matted together and the distal portion of the appendix was larger than one's thumb and contained a very hard concretion about the size of a large gallstone. After one or two stormy days she made a good recovery.

We see quite a large number of tubercular abdomens, and, frequently, deposits around the ileo-cæcal valve and in the neighbouring glands *simulate* ordinary appendix mischief plus chronic malaria. We have been surprised at the number of cases which are complicated by tuberculosis of the abdomen. We have found that the early cases often clear up after exploratory laparotomy. Unfortunately the great majority are very extensive and laparotomy has not been of much value in these extensive cases. We have started performing resection of the cæcum and ascending colon for tubercular disease which is localised to this area. We have a case waiting for such treatment at the present time. Laparotomy, a few weeks ago, revealed tubercular trouble in the cæcum and the last few inches of the ileum only. At the time her condition contra-indicated resection. She is now much better but the persistence of her pain makes her wish for further treatment.

Gastric and Duodenal Ulcer.—Another subject which is at present claiming a good deal of our attention is ulcer of the stomach and duodenum. On first coming out to India we were told that almost all epigastric discomfort and pain was of hepatic origin. Personally I used to marvel at the skill of some clinicians in palpating the liver, especially with the patient standing! It seemed quite reasonable that, in a land where malaria and dysentery are so prevalent, the liver should very often be at fault. In the early years of one's work in this country there were many cases of "hepatic dyspepsia" where the diagnosis was often arrived at far too hurriedly and one often wondered at the frequency of "hepatic tenderness" During the past five years we have been slowly proving that many of these so-called cases of "hepatic dyspepsia" are definite cases of gastric and duodenal ulcer, frequently complicated by chronic appendix disease. At first we only operated upon those cases which were clinically very definite. But of late, with the assistance of the confirming "barium meal" we have been operating upon an increasing number. We have gone very slowly and very carefully and have only chosen surgical treatment in really convincing cases, so much so that in every case operated upon, so far, we have discovered an ulcer. In 1925, 19 gastro-jejunostomies were performed and this year we have have operated upon 12 cases, to date (March 31st, 1926). The gall bladder is carefully examined in all cases and, although it is sometimes affected, we have been surprised by its freedom from any marked disease. As our cases so far comprise Khasis, Lushais, Nagas, the people of the plains and Europeans, it may not be out of place if we pause to consider the subject.

Symptoms and Signs.—The most frequent symptoms is pain centering in the right epigastric region but radiating in many directions. Quite recently we had a case where the pain was chiefly in the sigmoid.

Tenderness.—It would appear that some teaching suggests that *superficial* tenderness ought normally to be elicited in the presence of an ulcer. This may be true of an acute ulcer. We frequently find that chronic ulcers when first admitted may be associated with marked superficial tenderness but on low diet the tenderness gradually becomes less marked until it is often difficult to elicit even deep tenderness. In some cases there is no tenderness.

Vomiting.—We have not found this a very common symptom except of course in the cases of partial or complete obstruction.

Hæmorrhage.—This is infrequent.

"Barium Meal" examination.—During recent months this has been done systematically. We have found it the greatest possible help in diagnosis. A considerable number of the cases show "delay" in the stomach up to 5 or 6 hours. In a recent case of ulcer of about 14 years duration there was delay in the stomach for over 24 hours. Typical incisuræ were very seldom seen on the screen but hyperperistalsis was quite common and usually began about 5 to 10 minutes after the administration of the meal.

As a matter of interest it may be noted that ptosis of the colon was frequently observed.

Treatment.—A good deal of medical treatment has been tried and in some cases for many months, but the results have been generally very disappointing. A return to ordinary diet was generally followed by a return of the symptoms. We have come to the conclusion that surgical treatment is by far the best and the operation usually performed has been posterior (no loop) gastro-jejunostomy. In a few cases the size of the ulcer or the extent of the adhesions necessitated the performance of the anterior operation. The majority of the ulcers were not more than ½ inch in diameter, but a few were very large, and in one case about half the size of one's fist, including the surrounding inflammatory mass. The majority of the gastric ulcers were on the lesser curvature near the pyloric ring. The duodenal ulcers were mostly in the second part of the duodenum. Only in a few cases was there gall bladder involvement and in these cases the ulcer was generally adherent to the liver. Under such circumstances it is easy to understand the difficulty of diagnosis. The results have been very encouraging and about 95 per cent. have been either cured or immensely relieved. It is too soon for us to attempt to speak much about the more remote results which we hope to report in course of time. There are many points in the post-operative treatment to which one would like to refer but time will not allow more than one brief reference. In a young European patient (who had previously undergone surgical treatment for appendix abscess) the adhesions made the operation unusually difficult. Serious regurgitant bilious vomiting set in about 24 hours later. On the 5th day a secondary operation had to be performed and a secondary anastomosis made between the fourth part of

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the duodenum and the jejunum. This allowed the bile to pass and she made a good recovery.

Gallstones.—This trouble seems to be strikingly absent, but we have had a few cases even amongst Indians. The cases seen were all associated with sclerosis and contraction of the gall bladder. In one case there was a large stone impacted in the hepatic duct but the patient's condition did not permit of more than cholecystotomy. We have a case in hospital at present. A few weeks ago she was admitted for pain and severe vomiting. The diagnosis lay between gallstones and ulcer. When placed on the operating table she had no pulse in the right wrist and a very feeble one in the left. On opening the abdomen we found an ulcer on the lesser curvature, which was adherent to liver, plus a thickened gall bladder with 5 or 6 stones. Her condition did not permit of both cholecystectomy and a short circuit operation and so the latter was chosen. She did very well after the operation but was still on the lowest possible diet on the tenth day, when she had a sudden terrible hæmorrhage from the ulcer which deprived her of about three pints of blood. In desperation we washed out the stomach when she appeared to be on the point of death. The hæmorrhage stopped but we did not expect her to live the night. Strange to say she recovered and is doing fairly well. As soon as her condition allows we hope to remove the bladder and stones. I think you will agree that cholecystotomy is not sufficient in such cases. In another case we were scooping out stones from the gall bladder when something string-like was detected adherent to the wall. A finger was inserted and to our surprise a long but dead Ascaris was delivered. It had evidently gone up the bile ducts and perished in the gall bladder. In passing one may mention that round worms in the gut often deceive the finger when trying to deliver the appendix through a small wound.

Urino-Genital Surgery.—It is interesting to note that so far we have not discovered* a renal or ureteral calculus in any of our Indian patients. We have had a few cases of pyonephrosis but without evidence of associated stone. We have carefully scrutinised the radiographs in suspicious cases but there have not been any convincing shadows.

Vesical calculus on the other hand is fairly common. We find *x*-rays of value in these cases, more in the presence of multiple stones or an encysted calculus. As all will agree the diagnosis is usually confirmed by a finger in the rectum or by the sound. In a few cases we cut for stone but in the great majority litholapaxy is performed. With small lithotrites we have crushed stones in children of 2½ years. When compared with districts like the Punjab our stone work is of course very small.

To pass rapidly on, it may be mentioned that we have a few cases of hydrocele, hernia and undescended testicles; enlarged prostates are very rare. You may be interested to know that we recently operated upon a case (the only case that we have seen in India, and sent to us by Dr. Foster) of ectopia vesicae in a young boy. Moynihan's modification of Maydl's operation for transplanting the whole bladder into the rectum was performed. The operation was satisfactorily completed and urine was passing per the urethral catheters which were brought out through the anus but unfortunately the patient was in a very poor state of health and died of shock. In a subsequent case we would be inclined to perform the operation in two stages unless the patient was in good health. We have recently had amongst our hill patients two cases of scrotal elephantiasis. Both were treated by excision of the scrotum and penile decortication and subsequent grafting from the thigh. The first case did very well and the patient recovered from his sexual debility. The second case is doing well but is still in hospital. We are sometimes called upon to perform a Wheelhouse operation for stricture but we have not found this operation so commonly required as it is at Home. Cancer of the penis is rare. Recently we had a case where total extirpation was performed and the urethra transplanted about an inch in front of the anus with resultant excellent urinary control.

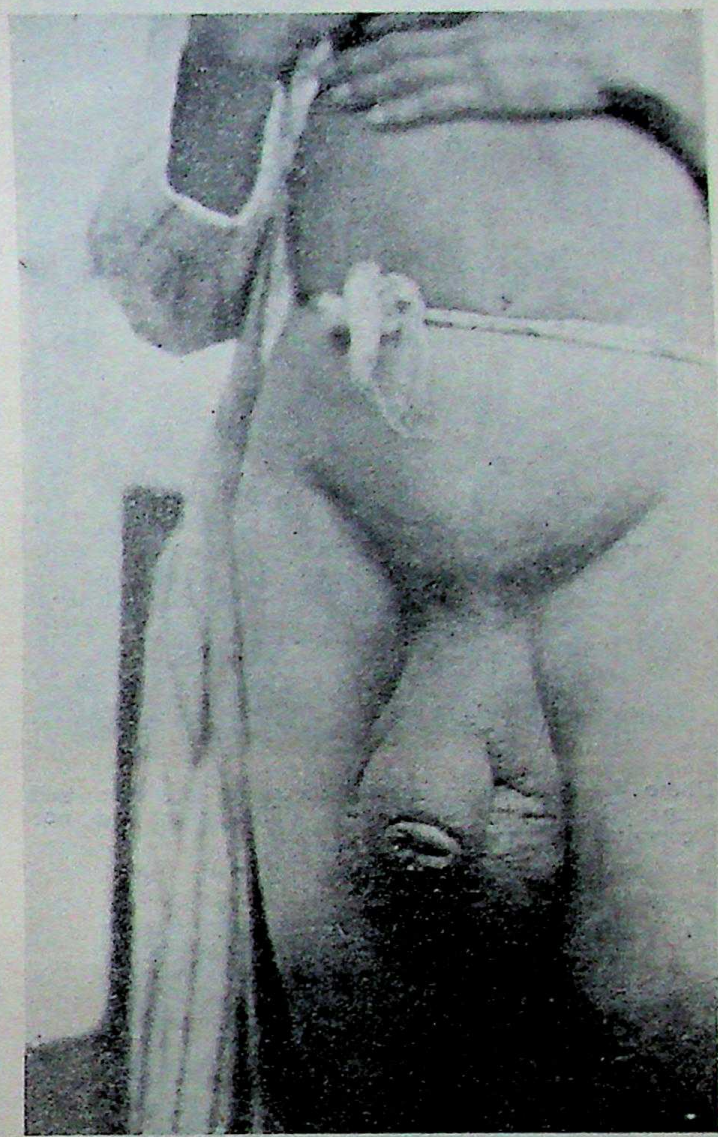

Photo 3.—A case of elephantiasis of the scrotum and penis. The patient had lived all his life in the *hills*. Operation with good result; sexual power recovered.

Surgery of the Chest.—Resection of ribs for empyema is in our experience a very rare event. We had a recent case associated with traumatic fracture of the ribs from a fall. After a prolonged convalescence the patient made a very good recovery. For the few cases of tropical abscess that we get we prefer the open operation, if possible, through the chest wall.

Orthopædic Surgery and Fractures.—The opportunities in this direction are increasing and we are obtaining a considerable number of these cases. There is a growing tendency for such cases to submit to surgical treatment. Arthritis deformans is frequently seen. Dental sepsis is quite common and we gather that there is a good deal of intestinal toxæmia amongst many of our patients. The shoulder and knee joints seem to be most often involved. For knees, fixed in a flexed position, we sometimes do a partial excision of the knee and the leg is then fixed in extension. We are getting an increasing amount of talipes to treat, and have frequently found it necessary to do tenotomy and apply plaster of Paris casts. These cases have done very well.

Amongst old unreduced dislocations we managed to reduce a dislocation of the jaw with a three months history. An old-standing dislocation of the hip was

* Since this was written we have had a case of renal calculus.

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Photo 4.--A large cavernous nævus of the face and lips. Reduced by electrolysis. (The patient did not complete treatment.)

Photo 5.—A patient aged six years with a large sacro-coccygeal tumour. Removal, with excellent result.

successfully reduced by open operation but the prolonged manipulations appeared to have induced considerable shock from which the patient died. The patient was very much disabled and surgical interference was only tried when other methods had failed.

We are attempting operation upon a certain number of malunited or un-united fractures. By a rigid aseptic technique we have had some success with wiring and plating bone and we are inclined to recommend it in certain cases. For instance, a case of un-united fracture of the femur in its lower third with wide separation of the fragments reached us five weeks after the accident. With great difficulty the fragments were brought into alignment and Lane's plates applied; (the case seemed to require Hey Groves double plates and bolts but we were without them at that time). The leg was kept in plaster for about six months before union occurred. While in hospital, the patient developed appendicitis, so, before he was discharged, we removed both the Lane plate and the appendix at the same time. He is now walking about but with a little shortening.

We get a fair amount of tuberculosis of the hip, knee and ankle. A case of early tuberculosis of the knee which was kept in plaster for nine months entirely recovered. Surgical removal during the active stage has very disappointing results. For healed tubercular hip with deformity we have found sub-trochanteric osteotomy quite satisfactory. We see very little tuberculosis of the spine but we had an advanced case recently. We made a spinal frame but the case went steadily to the bad.

Naturally we find *x*-rays of great help to our orthopædic and fracture work.

OBSTETRICS AND GYNÆCOLOGY.

No reference has been made to gynæcology and obstetrics, which forms our chief work. In the hills, women come to hospital with the greatest readiness. We have therefore excellent opportunities for the study and treatment of women's diseases. Uterine disease (and displacement) is exceedingly common. Many hundreds of pelvic examinations are made every year and we meet with a great many uterine displacements which are more or less symptomless. Sacral ache, dysmenorrhœa and menorrhagia are, however, very frequently associated with uterine displacement or disease. The operations of dilatation and curettage, perineorrhaphy and ventro-suspension of the uterus are frequently performed. We have attended a considerable number of deliveries in patients previously ventrofixed and have not seen any trouble in labour. Hysterectomy, saplingectomy and ovariotomy are performed less frequently. During 1925 we operated twice for ruptured extra-uterine gestation and also performed Cæsarean section twice and Cæsarean section followed by total hysterectomy once. One case of Cæsarean section was performed about 7 minutes after the death of the mother who died quite suddenly in her first eclamptic fit. The baby is still alive and doing well. A few cases which might have been treated by Cæsarean section reached us with a frank infection necessitating craniotomy. We are trying to establish regular maternity work and we are getting a steadily increasing number of "normal" cases especially amongst primiparæ who are not so hindered from entering hospital as are the multiparæ with their domestic ties. The following figures show the progress of the maternity work during the past three years:—

	1923.	1924.	1925.	Total.
Normal ..	30	42	57	129
Abnormal ..	13	25	23	61
Total ..	43	67	80	190

The growth of the maternity work is giving greater opportunities for the training of our nurses. An increasing number of pregnant women are attending the out-patient department where they receive antenatal care, have their pelvic measurements taken and their urine examined. A great deal has still to be accomplished and we admit many women for further treatment

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who have suffered seriously from long or untreated labours in their own homes. Vesicovaginal fistulæ are far too common and the variety that we generally see is that which is associated with destruction of the internal sphincter. We attempt operative treatment, but so far the results have been disappointing.

Photo 6.—A Khasi nurse looking after a European baby.

I fear that I have already trespassed far too much upon your valuable time and although there are still many matters such as cataract and other eye troubles, that might be referred to, I will draw to a conclusion.

Before doing so it will not be out of place, perhaps, if a word is stated about cancer. In the past twelve years I only remember seeing one case of cancer of the breast and not more, I should say, than a dozen cases of uterine cancer. We do not see much intestinal cancer but we see a few cases of gastric cancer. One of our gastro-jejunostomies in 1925 was for gastric carcinoma which had produced almost complete pyloric obstruction.

The most common form is cancer of the cheek and lips. One would suspect that it is influenced by the very common habit of chewing the betel-nut. We have had a few early cases where operation was performed. Many arrive after they have passed into the inoperable stage. We see a fair amount of sarcoma. The face, neck and upper extremity are chiefly affected. *X*-Ray therapy has caused a few of these growths to disappear in a remarkable manner, sometimes only to return later. You may also be interested to know that we have found *x*-rays of much value in reducing the size of some enlarged spleens, especially malarial spleens. In one of Lieutenant-Colonel Hodgson's cases of kala-azar the spleen was greatly reduced by *x*-rays after other treatment had failed.

In conclusion it may be stated that the upkeep of the hospital requires over Rs. 50,000 per annum. The Mission is only able to contribute about Rs. 8,000 of this amount and so our income has very largely to be raised from the fees of private patients. We receive many generous gifts from grateful patients.

Current Topics.

The British Social Hygiene Council.

A DEPUTATION of the British Social Hygiene Council, consisting of Dr. David Lees, D.S.O., F.R.C.S., and Mrs. Neville Rolfe, O.B.E., are at present touring India, and will be in Calcutta from January 27th to February 17th, 1927.

During their stay in Calcutta they will give a series of lectures and addresses to medical and lay audiences, dealing with various aspects of the campaign against venereal diseases. Dr. Lees will visit the hospitals and medical colleges and schools in Calcutta, and will give a series of post-graduate lectures to medical men at the Overtoun Hall, 86A, College Street, on February 1st, 3rd, 7th, 9th and 11th, at 6-30 p.m. These lectures will deal with modern methods of diagnosis and treatment of venereal diseases, and are illustrated by cinema films They are likely to prove highly interesting and instructive, and all medical men are cordially invited to attend.

Stovarsol in Benign Tertian Malaria.

AN interesting article on this subject is one by Dr. Ch. Vialette in the *Bulletin de la Societe de Pathologie Exotique*, Vol. XIX, No. 5, 1926, p. 359. The author studied the effects of Stovarsol treatment in 47 cases of benign tertian malaria—41 of them Europeans and 6 Africans—admitted to hospital at Rabat in North Africa. The majority of the cases studied were patients who had already passed through the first phases of invasion and who showed an established infection. Results were controlled by microscopic examination of the blood before and during treatment. At first Stovarsol was administered intravenously, but the author very soon abandoned the intravenous route in favour of oral administration, giving an average dose of one gramme daily for four days, then after an interval of five or six days a second similar course.

In the majority of cases it is reported that after the administration of 1.5 gm. to 2 gm. fever disappeared; sometimes 3 gms. were necessary to produce this effect; occasionally fever persisted after the latter dose, but an intravenous injection of Stovarsol then usually effected cure. On the other hand the disappearance of parasites was far less rapid. The author concludes that "Stovarsol has a rapid and favourable action in cases of benign tertian malaria. After a few doses the febrile rhythm is broken and the parasites disappear from the circulation. But in order to secure complete cure it is necessary with Stovarsol—as with quinine—to push the drug and to give repeated doses over a sufficiently long period." Stovarsol is about equal to quinine as a therapeutic agent in the treatment of benign tertian malaria; in chronic and relapsing malaria it is possibly even better. The drug is more easily taken and tolerated than is quinine.

Dr. Vialette's paper is admittedly a preliminary communication only, but it is of interest. The alkoloids of cinchona still remain the sheet-anchor of treatment for malaria, especially when administered with alkalies—as pointed out by Acton and by Sinton. Yet arsenic has a very definite value in the treatment of malaria;—in the reviewer's opinion more as a hæmatinic tonic after the treatment of malaria by quinine than as a direct line of treatment. The value of Stovarsol appears to lie in its high content of arsenic in organic combination; it is easily taken and well tolerated. It would be of special value in cases of malaria complicated by syphilis or by *Entamœba histolytica* infection.

The Wellcome Historical Medical Museum.

No science is more ancient and of more human interest than that of medicine; hence the particular fascination of delving into its rich and varied past. And the medical visitor to London cannot do better than spend an hour or two in the Wellcome Historical Medical Museum, 54A, Wigmore Street, London, W.1. This Museum has always been a joy and a delight to wander through. It has recently been re-opened on October 14th, 1925, at a ceremony presided over by Sir Humphry Rolleston.

The Museum contains an extensive collection of rare objects, pictures, sculptures, manuscripts, early

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printed books, etc., illustrating the evolution and practice of medicine and allied sciences throughout the world from prehistoric times, and includes a section dealing with primitive medicine, surgery and the healing arts amongst savage and semi-civilised peoples of to-day.

Special sections are devoted to memorial collections of objects originated by, used by, or associated with eminent men who have made history by their great achievements in medical science. These include Dr. Edward Jenner's relics, original manuscripts, instruments, etc., connected with his development of vaccine treatment for small-pox, and also Lord Lister's original appliances, chemical reagents and other materials which he used in the development of his methods of antiseptic surgery as practised by him in the "Lister Ward" of the Glasgow Infirmary and elsewhere. A portion of the original "Lister Ward," reconstructed from the actual material and fitted with the original equipment, forms an important exhibit in the Museum.

The aim and purpose of the founder are to render the collections of real educative value and to make them helpful to research workers, students and others interested in the history of medicine and allied sciences.

In the course of his introductory speech from the chair, Sir Humphry Rolleston said:—The study of medical history is somewhat paradoxically a modern development, and its expansion in this country has been largely due to Dr. J. F. Payne, Sir W. Osler, Sir Clifford Allbutt, and especially to Sir N. Moore, who, as President of the Section of the History of Medicine of the International Congress of Medicine in London, opened for the first time this Museum on June 24, 1913. Since then it has grown from strength to strength, and, after a complete re-organization, which necessitated its closure for eleven months, is virtually a new museum. This research museum is intended to be continually progressive, not to remain as the last word in 1926, but to keep up with the advance of medicine. In the various groups, such as anatomy, physiology, chemistry, pharmacology, orthopædics, obstetrics, psychiatry, massage and antiseptic surgery, it will show at a glance the evolution of ideas, discoveries and inventions in a really scientific manner. Thus, in addition to advances, it will elucidate the retrogressive changes which took place in some ancient eastern countries and in Europe during the dark ages.

Familiarity with what "famous men and our fathers who begat us" have done to build up our present state of knowledge has a great educational value. Further, it exerts a wholesome influence in making us feel modest from the realization of what our professional ancestors did in so much less favourable circumstances; we may indeed even find that discoveries made, or largely anticipated, by them years ago and long forgotten have independently again been brought to the light of modern eyes. It is salutary to look back and occasionally, as has been done with much advantage in the past, to act on the dictum "back to Hippocrates." The Great War carried the practice of surgery "back to Lister," the centenary of whose birth will be celebrated next year. Antiseptic surgery and anæsthetics are the two greatest milestones in the advance of surgery, and here is presented a collection of Listerian relics—unrivalled for its completeness; it includes part of Lister's ward in the Royal Infirmary, Glasgow, where he did his immortal work, which, had it not been for Mr. Wellcome's prompt action, would have been for ever lost when the building was demolished two years ago.

London is fortunate indeed in this unique museum, and the whole medical profession are under a deep debt to Mr. H. S. Wellcome for his unbounded generosity and enterprise in making and throwing open to us all this wealth of historical lore. It is indeed difficult to say what this museum, with its contents and a library of more than 100,000 books, manuscripts and incunabula so quietly amassed, will mean to medicine in the future. Its resources have always been most freely at the call of those interested and working at the subject.

Sir Arthur Keith, M.D., F.R.C.S., F.R.S., Conservator of the Museum, Royal College of Surgeons, England, gave an address on the history of medicine.

"England has a way of throwing up sporadic crops of great men; she had a bumper crop in the 19th century: Darwin, Galton, Taylor and Pitt-Rivers came along almost in a bunch—Darwin leading. It was Pitt-Rivers who demonstrated how reliable human history could be built up, bit by bit, in the shelves and show-cases of a museum; it was he who made the spade an instrument of exact history in the hands of a trained observer; it was he who pressed home the study of living primitive peoples as a clue to the customs, myths and beliefs of our long dead ancestors. What Pitt-Rivers did for human culture in general Mr. Wellcome has sought to do for a great branch of human knowledge—all that pertains to the art and science of healing. He has ransacked the world and brought together under one roof a rich, rare and vast assortment of materials for the history of medicine such as has never before been seen or studied in any country.

Now the evolution or history of medicine is more difficult than any other branch of knowledge to illustrate by museum methods. The trend of evolution is nearly always towards complication; if we trace the history of a man's fighting weapons, we begin with a few types of a simple kind and we end in these modern days with the innumerable and highly differentiated engines of war. But in medicine it is otherwise; even amongst the most primitive races of mankind, we find that the practice of medicine is founded on an elaborate code of belief; these beliefs are the fine-drawn gossamer of savage fancy—altogether too delicate threads for the clumsy fingers of museum curators to touch. If our task were merely to illustrate how the medicine man, whose image you will see to-night in his hut in New Guinea, seated amidst the simple and uncouth emblems of his art, becomes the fashionable physician of Harley Street with the artillery of modern science at his disposal, there would be no technical difficulty, for from the countries which lie between New Guinea and Harley Street we could cull a perfect series of ascending forms—an intermediate series of the kind which is so dear to the hearts of museum curators. Our difficulties begin when we seek to portray how the native practitioner looks upon the human body when it is well and when it is ill. Until we have surmounted this difficulty, we cannot appreciate the riches which are shown in Mr. Wellcome's "Hall of Primitive Medicine."

To give a concrete representation of the beliefs in which medicine begins is particularly hard for men like myself. We have been trained to accept only what we can see and prove, to suppress all our childish notions. We find it almost impossible to take the mentality of primitive medicine seriously. It would have been otherwise with Lewis Carroll, the immortal creator of "Alice in Wonderland"; he understood how children reasoned, and, therefore, could have entered the hearts of primitive men without effort. There can be no doubt that in the play of his fancy, early man, like the primitive races of to-day, was a child and had a childish way of reasoning. The late and gifted Dr. W. H. R. Rivers, in his enquiries into the theory and art of medicine among the natives of Melanesia, was able to lay aside the scientific armature of his mind and to adopt the point of view of the practitioners he encountered in primitive communities. He found that the rudest native practitioner had, like his counterpart of Harley Street, a definite theory of disease and that the means he adopted for its cure were a logical outcome of this theory. Had Lewis Carroll told a New Guinea medical man that after the material Cheshire cat had vanished its smile remained behind, the statement would have been accepted without the raising of an eyebrow. It must be a very long time ago since primitive man began to look on the human body as a mere husk and the spirit within it as the real person, for this way of interpreting the living body is almost universal among native peoples. On this belief the native physician bases his treatment of disease. If a man is to be free from illness his spirit must remain free, intact, uninjured. Illness, the native holds,

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springs from the spirit—not, as we believe, from the flesh. If the spirit be driven out of the body and forsakes it permanently, then death occurs. This is how the Melanesian explains death to himself and to his patients. Hence, a native practitioner's business is to discover in what way injury or damage has fallen on his patient's spirit, and, as these injuries are usually caused by other spirits or baneful influences, it is clear that a native, to practise successfully, must have studied and mastered the ways and wiles of these immaterial beings and things. The expert native practitioner is he who can best cajole the cloud of spirits which permeate the air of primitive communities.

As we dig into the beginnings of medicine, we find that its foundations are laid on leechcraft, witchcraft and priestcraft. The early physician was also magician and priest. Unless you have grasped this truth you will altogether fail to understand Mr. Wellcome's "Hall of Primitive Medicine"; for in that Hall you will find a wealth of amulets, charms, talismans, mascots, phylacteries, totems, fetishes, divination bowls, effigies, idols, masks and ceremonial dresses. When you examine the contents of that room you are really surveying a massed field of therapeutic artillery—the batteries by which ancient physicians sought to banish illness and disease from their patients, thus staving off death. The counterparts of the native artillery in Harley Street are the stethoscope, the bismuth meal, note-book for prescriptions, and a certain professional air.

The divination bowl, fetish, amulet, charm, mascot and effigy are but the symbols of the ancient practitioner's art; each is pregnant with significance; it needs a world of knowledge to interpret that significance. It is otherwise in all the modern departures of medicine. You will have an opportunity to-night of examining in this Museum all the stages in the evolution of utensils, apparatus and instruments employed in modern medicine and surgery; never before has the story of surgical instruments been told with such a wealth of illustration as will fall under your eyes here. The microscope is the main instrument of medical progress; this Museum contains its full history in the great collection shown in the Gallery. Never before have such pains been taken and so much wealth lavished to secure exact reproductions of the conditions amidst which druggist, chemist and apothecary carried out their respective callings in past times. You will see the actual ward from the old Infirmary of Glasgow in which Lord Lister banished from the world for ever some of the most dreaded of human sufferings. If you are inclined to think that the value of this exhibit is sentimental rather than useful, a glance at its bare ugly walls and its sordid equipment will alter your opinion. I was trained in just such a ward and know that the picture here preserved is true to its time. The men and women of a younger generation, who have grown up in clean bright wards with modern equipment can only realize the blessings which progress has brought them, when they view the ward in which Lord Lister's patients lay as he and his nurses ministered to their needs.

You will turn away from Lord Lister's ward devoutly thankful that it is now only a historical record; it depicts a state of matters which we have left behind us. It is possible, as you walk through the Hall of Primitive Medicine and your eye catches again the weird and uncouth equipments of native witch doctors which cover its walls and fill its cases; that you will view these exhibits as mere flotsam and jetsam from the Dead Sea of medicine—one which enlightened England has long since swept away. I should like to think this is so, but when I see, as I sometimes do, mascots on the motor cars of the wealthy, charms and amulets treasured by many people—both rich and poor—ignorant and educated; when I see, as I occasionally do, the quack preferred to the man who has given his life to the study of rational medicine; and when I see learned men call in spirits to explain unusual physical phenomena; then I am not quite so certain that this part of Mr. Wellcome's Museum does represent altogether a past stage of things. In all of us there still remains more than a trace of the primitive man.

Now I come to what is the main matter of my discourse. What is the service that such a museum as this should render to medicine? Let me put the question on a wider basis. What should museums do for us? You will pardon my immodesty if I refer for a moment to the services which museums have rendered to myself. Thirty-five years ago I returned from a sojourn in the East, where I had accumulated a great many facts relating to anatomy, and in my pocket just enough money to secure food and lodging for a year or two. My little cargo of anatomical facts was of no use in the world of learning until it had been compared with and added to cargoes brought home by previous voyagers into the realms of anatomy. It was my first duty to assimilate the publications of other workers and to study kindred material which had been gathered in our great Museums. The British Museum was thrown open to me; in its Reading Room attendants brought and laid before me books and manuscripts of all times and of all countries. The treasures in the Natural History Museum, South Kensington, were placed freely at my disposal. The Museum which I have now the honour to be closely connected with, served me as a study and as a research room. All of these institutions were provided for me gratis, free and for nothing. I never enquired into the cost of running these great institutions during the years I was using them, but I can tell you what all three cost last year. The British Museum, Bloomsbury, required £221,000; the Natural History Museum, South Kensington, £100,000; the Museum of the Royal College of Surgeons, the most economical and best Museum of its kind in the world, £6,000. Now that is a great sum of money. Museums, as Mr. Wellcome knows well, are very costly machines to run, to say nothing of the initial cost of bricks and mortar, and also outfit. To produce an income of £327,000, the sum now spent annually on these three institutions, needs a capital of about 6½ millions. You can see, then, that in those early days of study and research in London I was, although I did not realize it, terribly wealthy. I had the privileges of a Crœsus—a multi-millionaire. At least I had at my disposal that which had cost millions. It is plain that museums as instruments of research are very costly, and you may ask if the country is getting an adequate return for its great outlay. Well, if I had been the only student who then enjoyed museum benefits, our country would have had an altogether unsatisfactory return for its expenditure, but I was only one of many of that generation. The generation which was young thirty years ago is now providing their country with leaders and teachers, and England is reaping to-day the harvest she sowed in museums a generation ago. You see that I do not hesitate in regarding the increase of knowledge—the fostering of research—as the first duty of a museum. Unless a museum is permeated with a spirit of enquiry it is dead. It is not enough to furnish a museum with the materials needed by students; no conservator can understand what a student needs unless he is also a student. The staff of a museum must be permeated with the love of knowledge and know how it can be extended if their institution is to thrive; and no man can continue to be a student unless you give him an exit for his knowledge. Unless he is encouraged to coin his gold and pass it into circulation, his mint becomes choked. One knows that a museum is prospering when the members of its staff are participating in the proceedings of learned societies and contributing to their publications. One knows that a museum is fulfilling its primary function when its rooms and closets are frequented by research students from homelands, colonies and foreign countries, and one knows that its contents are being rightly used by the frequency of grateful acknowledgments in learned publications. The literature which issues from a museum determines its status, and in this literature I include catalogues.

If the first duty of a museum, such as this of Mr. Wellcome, is to serve the needs of students and

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through students the public weal, there is a second duty no less important. There is its immediate duty to the public—the duty of direct education. It is this double duty of a museum that taxes the ingenuity of us conservators. To expose the whole of our resources to the gaze of visitors would be to satiate—not to whet—their curiosity. We produce in them not only headache but mental dyspepsia. We have to select from our great stores on which special students regale themselves, just those prime pieces of instruction which when set in a right order, tell their story with emphasis and without words. Such an art needs a special genius, just as "window-dressing" does in the world of commerce, but I have noticed that the best elementary treatises are usually written by the most learned of our masters, and I am therefore hopeful that the most learned of our curators will also prove the greatest craftsmen in the art of "case-dressing." It is an art which makes a special appeal to Mr. Wellcome and he has surrounded himself with a staff of learned and expert men.

All of us who regard museums not only as repositories of valuable things, but as engines for the advancement of knowledge owe a debt to Mr. Wellcome. Students of history are usually poor men and this is particularly true of those who seek to unravel and write the true history of medicine. The materials needed for our studies are far beyond the resources of our purses. There are those men, who, setting out in their careers to banish care by obtaining a sufficiency to carry them and theirs to the end of life's journey, awake to find that wealth accumulates on them so fast that affluence becomes more burdensome than the cares of poverty. Well! we who benefit from museums are not in this group of men. If a poor man has to seek comfort in philosophy, a rich man, if he is to retain his soul, has to seek it as a necessity. The other day it was my good fortune to read a book written by a man who has become both a millionaire and a philosopher. "I have long felt and believed," he tells us, "that every man who has attained material success should look upon himself as an investment, so to speak, which the community has made. In return for the opportunities given to him and for the financial results they have brought, it is up to him to yield dividends in service and in other things of value to the community." Long before this philosophy for wealthy men had been formulated, Mr. Henry S. Wellcome, in his own quiet but efficient way, had begun to put it into practice. He had come to the rescue of us poor students and put at our disposal, and for the ultimate good of mankind, this Museum with its rich and rare stores of knowledge culled from all the countries of the world and from all periods of time. He has lifted our poverty above all dreams of avarice and has thereby earned the lasting gratitude of all who believe that the safety of our civilization lies in the progress and dissemination of knowledge."

Dangers Associated with Medical Practice and How to Avoid Them.

By W. E. HEMPSON,

Solicitor to the British Medical Association.

(*British Med. Journ.*, Aug. 21, 1926, p. 329.)

THE responsibilities which a medical man assumes appear to fall within three distinct categories—to himself and to his profession, to his patients, and to the State.

Mr. Hempson quoted with approval a leading article in the *Times* of March 4th, headed "Doctors and the Public."

"To contend....that the public interest can possibly be served by exempting anyone who is to enjoy the status of a registered medical practitioner, from training in those sciences by means of which alone a diagnosis of disease can be made, is on the face of it ridiculous. There can be no 'backdoor' to the *Medical Register*. Nor can the public suffer for a moment any depletion by doctors of their right to determine the nature of a patient's complaint."

Of late years there have sprung up many new cults, such as osteopathy, chiropractic, Abramsism, and Eddyism. Such lures as they may possess are to be avoided by the self-respecting practitioner as presenting features which may tend to imperil his good name and professional reputation.

Mr. Hempson uttered a warning against the practices of fee-sharing and accepting commissions.

The responsibilities of a medical man towards his patients, regarded from a legal standpoint, were aptly summarized by a learned judge in the following words:

"Every person who enters into a learned profession undertakes to bring to the exercise of it a reasonable degree of care and skill. He does not undertake, if he is a surgeon, that he will perform a cure, nor does he undertake to use the highest possible degree of skill. There may be persons who have higher education and greater advantages than he has, but he undertakes to bring a fair, reasonable and competent degree of skill, and the question which always arises is whether the injury must be referred to the want of a proper degree of skill and care in the person whose conduct is sought to be impeached."

The arrangement between a medical man and his patient has for its foundation and basis that of "*contract.*" The patient who retains the services of a medical man undertakes to pay his proper fees for treatment received, and the medical man undertakes to bring a due and proper meed of skill to bear and to treat the patient with every reasonable care.

The obligations of a medical man to the State arise under the head of criminal liability for negligence, and the following extracts from the dicta of learned judges will suffice to make the position clear in this respect.

"Where death is occasioned by negligence on the part of anyone professing to deal with the health of others whether he be a licensed practitioner or not the offence may, under certain circumstances, indicating a wanton and malicious disregard of human life, amount to murder. Of course a medical practitioner who should intentionally and with malice cause the death of a patient would be held guilty of this crime, but in no case will an indictment for murder lie unless there be a felonious destruction of life with malice either expressed or implied. The law holds, however, that every person, whether licensed or unlicensed, who deals with the life or health of any of His Majesty's subjects, is bound to have and to use competent skill, and sufficient attention, and that if the patient die for want of either the person is guilty of manslaughter."

The late Lord Ellenborough expressed himself as follows:—

"To make out a case of manslaughter, the prisoner must have been guilty of criminal misconduct arising either from the grossest ignorance or the most criminal inattention."

Of all professional men, the medical man is the one most popularly selected for speculative actions.

Nothing is easier than to attack a medical man on the ground that he has inaccurately or imperfectly diagnosed a particular case, or that, having correctly diagnosed it, he has improperly treated it, or, in the case of an injury by fractures or otherwise, that he has failed to appreciate the severity of the injury, or, having correctly diagnosed it, has failed to apply to it modern and skilled recognized surgery.

It is also to be found that little difficulty is experienced within the ranks of the medical profession itself in obtaining evidence whereby to give some support to the allegations of negligence or incompetence which are preferred.

In certain instances medical men in equal numbers have appeared in open court before judge and jury, of whom one half gave evidence in approval and the other half in condemnation of the treatment or diagnosis by one of their colleagues.

During one period of fifteen years, in which 2,467 cases were referred to Mr. Hempson by the Medical

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A NOTE OF WARNING!

DOUBT having been expressed by a medical practitioner in a recent issue of the *B.M.J.* as to the efficiency of Dimol when taken in the form of pulverettes, we desire once more to call attention to the fact that, where there is a deficiency of pancreatic enzyme, all keratin-coated tablets or pulverettes are liable to pass undissolved throughout the intestinal tract.

For this reason, and at the suggestion of various correspondents, sugar-coated B Dimol pulverettes (yellow) have been prepared and are found to give most gratifying results. They are partially dissolved in their passage through the stomach, but the action of Dimol is not impaired thereby, and is free to exert its powerful influence immediately after its passage through the pylorus; whereas the keratin-coated A Dimol pulverettes (white), even under the most favourable conditions cannot be expected to get to work so quickly, and may even, as above explained, pass undissolved.

Each pulverette contains 1 gr. pure Dimol, and Dimol is guaranteed by the Rideal-Walker test to be 35 times more efficient as a bactericide than carbolic acid; that is to say, in administering 3 Dimol Pulverettes, the patient is receiving the bactericidal equivalent of 105 grains of carbolic acid. Moreover, it is not absorbed, being voided with the fæces after doing its work.

When we are able to repeat this dosage four or five times a day without affecting the appetite or digestion, and without action on the mucosa, we can readily understand the excellent results which are obtained by the administration of Dimol in the treatment of auto-intoxication due to intestinal putrefaction, non-amœbic dysentery, rheumatoid arthritis, acute and chronic colitis, acute gastro-enteritis and intestinal fermentation.

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Defence Union, nearly 500 involved the defence of members of the profession in actions for damages founded upon allegations of want of care and skill in the treatment of their patients, and nearly 800 had relation to libel and slander actions either prosecuted or defended on behalf of medical men.

Mr. Hempson warned practitioners against failure to observe and act upon the danger signal which is ever present in these cases. Some complaint in regard to the account rendered, with a carefully veiled innuendo that the patient had not made satisfactory progress or recovery, is usually to be found as the starting-point, or alternatively a suggestion that if some other remedy than that prescribed had been resorted to, better results would have been obtained.

A communication of this nature is a prelude to trouble brewing. If there is doubt or difficulty as to the manner in which it should be dealt with, then advice on the subject should be sought through those channels of knowledge and experience which are open to you.

One further point must also be accentuated—namely, "beware of compromise." If your account for services rendered is impeached on the ground that you did not give value for money, your duty to yourself and to your profession is to enforce payment of it through the proper legal channels. If your patient, or his or her near relatives, impugn your treatment, insist upon a full and complete withdrawal of such allegations, and refuse to continue further to attend them if this be not forthcoming.

Mr. Hempson cited the following interesting case:—"A medical man was threatened with an action for damages arising out of his alleged unskilful treatment of a patient. Left to himself he would have settled it on any terms within the compass of his means as he dreaded the publicity which would follow upon its being heard in court. To this I absolutely refused to be a party. The solicitor acting for the claimant came and saw me, having travelled some 200 miles to do so. He opened with an offer to accept £100 and his costs, coming down by gradations to his travelling expenses to London, which I incontinently refused. He left much chagrined, and did not trouble me further."

Civil liability for neglect lies in the failure to exercise reasonable care and skill, whilst gross ignorance or criminal inattention are necessary incidents to support a charge of manslaughter, and a wanton and malicious disregard of human life in the treatment of a patient have been held to amount to murder.

Mr. Hempson strongly recommended medical men to join one of the defence societies immediately after they have registered. Outside this protection a man stands alone, never knowing when or in what circumstances his treatment of a case may be impeached, or the extent to which such an impeachment may be carried. The subscription to any one of these societies should be within the competence of all, and it is a species of insurance which no prudent man should neglect.

Bronchial Spirochætosis.

IN the *Revue Pratique Des Maladies Des Pays Chauds* for April 1826 Dr. Dopter has an interesting article on this condition. He regards it as a definite clinical entity which, though seldom infectious, may in some cases occur in epidemic form. He mentions an instance in which twenty-four persons were infected by a single patient.

Most of the cases begin with coryza and appear to behave like other acute infections of the respiratory passages, others take their origin from a Vincent's angina, others begin insidiously or with primary bronchitis.

General symptoms are usual, frontal headache, wasting, irregular fever, sometimes hæmaturia. There is usually abundant expectoration which may be blood stained, accompanied with cough. Five out of forty-two cases had hæmaturia, and in three of these cases spirochætes were found in the urine. There is sometimes an association with tuberculosis.

Stress is laid on the frequency with which the condition gives rise to a generalised spirochætosis, though in most cases the manifestations appear to be confined to the air passages.

Treatment with stovarsol in large doses gave remarkable results, even in cases which had proved refractory to prolonged treatment by other drugs. The doses employed were 0.75 to 1 gramme daily for fifteen to twenty days. The occurrence of diarrhœa and even jaundice is not regarded as a good reason for interrupting the treatment. In a few cases in which stovarsol failed, large doses of tincture of iodine (*French Codex*)—fifty to seventy drops by the mouth daily—gave excellent results.

Posture during Anæsthesia.

MR. W. MYEAR in the *American Journal of Surgery* for August 1926, lays stress on the importance of adopting the Trendelenberg posture both during and after anæsthesia.

This position is recommended not merely to avoid the dangers of aspirating material into the bronchial tubes, but also because it ensures a proper blood supply to the brain and so helps to prevent failure of the vasomotor mechanism.

Anæsthesia in Abdominal Surgery.

By Professor H. FINISTERER.

(*British Med. Journ.*, Aug. 14, 1926, p. 290.)

ANÆSTHESIA has become a highly specialized subject, as will be seen from the following brief extracts from a paper by Prof. H. Finisterer of Vienna at the meeting of the British Medical Association.

The work of Crile has revolutionized the methods of administering anæsthetics and the paper by Professor Finisterer may be regarded as a summary of the most modern methods of procedure which are in vogue in Europe and America.

It is to be feared that some of these are too complicated for every-day use in Indian practice but our readers will be interested to know what is being done in countries where extreme specialism is practicable.

Prof. Finisterer said that for many years he had practically employed only the regional and the combined methods. He refuses to operate on patients who insist upon a general anæsthetic.

The advantages of general narcosis are complete loss of consciousness, complete muscular relaxation, and the ability to examine the entire peritoneal cavity. Its unfavourable features are primary danger of the anæsthetic, fall in blood pressure, operative shock, damage to the brain, heart, kidney, adrenals, etc., and lung complications.

To eliminate the disadvantages of general narcosis chloroform or ether is replaced by nitrous oxide, which when properly used is practically without danger. Its disadvantages are that frequently there is not enough relaxation of the abdominal musculature. This, however, can be obtained simply and effectively by the injection of novocaine into the musculi recti. Ethylene mixed with 10 to 20 per cent. oxygen gives a deep narcosis with marked relaxation without any bad effects. Its only disadvantages are its inflammability and explosive character. Acetylene is equally efficacious. Its greatest disadvantages—inflammability and explosiveness—can be practically eliminated by caution and use of Gauss's "re-breather."

By Crile's method of anoci-association the sensory nerves are blocked by injection of novocaine, and unconsciousness is effected by using nitrous oxide. Combined anæsthesia has been adopted by many surgeons. Through careful anæsthesia of the peritoneum of the anterior abdominal wall the greater part of the narcotizing agent can be avoided. It is necessary to inject novocaine also into the mesentery. Nitrous oxide or narcylen may be

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used as a supplemental agent. Ethyl chloride has also been used as a supplement to local anæsthesia by different surgeons, but it is dangerous.

Regional Anæsthesia.—To make extensive laparotomies really painless it is necessary to anæsthetize the peritoneum of the posterior as well as the anterior abdominal wall. This can be achieved by paravertebral or spinal anæsthesia. The agent generally employed is novocaine, of which on an average 200 c.cm. of ½ per cent. solution is used. Tutocain is much more effective than novocaine, necessitating the use of only ⅛ to ⅛ per cent. solution. As a pre-operative measure the patients receive, one hour before operation, 0.02 gram pantopon, and then, a quarter of an hour before operation, 0.01 to 0.02 gram morphine with 0.00025 to 0.0005 gram atropine. It is necessary to have a complete anæsthesia of the anterior abdominal wall. In order to obtain this, besides the external injections on the lateral border of the rectus muscle, it is advisable to inject novocain after opening the abdomen from the inside as far laterally as possible into the properitoneal tissue.

Mesenteric anæsthesia is the simplest and least dangerous method of regional anæsthesia; it is satisfactory in all cases in which all pulling can be avoided. It is entirely satisfactory in cases of resection for a movable ulcer or cancer in ptotic stomach; but when the ulcer penetrates into the pancreas a supporting narcosis is necessary. Mesenteric anæsthesia should be used in every operation begun under general narcosis in order to decrease the operative shock (Pannett).

Paravertebral anæsthesia is of advantage only in operations in which injection on one side suffices—for example, in colon resection, cholecystectomy, etc. *In cases of doubtful diagnosis it is far better to infiltrate the anterior abdominal wall prior to incision, examine the abdomen under short ether or nitrous oxide narcosis, and continue the operation with mesenteric or splanchnic anæsthesia.*

Splanchnic anæsthesia after the method of Braun is almost without danger, and in about 90 per cent. of operations on the upper abdomen sufficient.

Parasacral anæsthesia, combined with blocking of the lumbar segment, is sufficient for radical operation for cancer of the rectum and for all gynæcological operations.

By the use of regional or combined anæsthesia the results of major abdominal operations are improved, because death from so-called operative shock, pneumonia, and atony of the bowel can be almost always avoided.

"The Post-Graduate Medical Journal."

THOSE of our readers who are proceeding to England may be interested in the Fellowship of Medicine and Post-Graduate Medical Association, whose headquarters are at No. 1, Wimpole Street, London, W. 1. The Fellowship provides post-graduate lectures; special courses in the various special branches of medicine and surgery at the London hospitals; and a general course at the 50 general and special hospitals affiliated to the institution. The minimum annual subscription is 10*s.* which admits the holder to certain special lectures and demonstrations, and includes a copy of the monthly *Post-Graduate Medical Journal,* which is the official journal of the Fellowship.

The journal itself is published at a subscription rate of 6*s.* annually. A recent number which has come to hand contains lectures by Dr. G. A. Sytherland on breathlessness and dyspnœa in children; by Mr. H. P. Winsbury White, F.R.C.S., on the diagnosis of urinary diseases in children; by Dr. S. Roodhouse Gloyne on the pathology of bronchiectasis; by Mr. Zachary Cope, M.S., on surgical cases in outpatient practice; by Sir Arbuthnot Lane on the importance of post-graduate training; together with reviews and editorial notes. The journal is full of interesting matter. Communications with regard to the journal or the Fellowship should be addressed to the Secretary (Miss M. Roy) at No. 1, Wimpole Street.

Proceedings of the Bombay Medical Council.

IN accordance with a resolution passed by the Bombay Medical Council at a meeting held on 20th September 1926, the following summary of its proceedings is published in the medical press for general information.

1. Mr. Joseph Michael Pereira, M.B., C.M. (Edin.), was called before the Council to answer a charge of issuing sick certificates in a case in which he had not been in personal attendance on the patient during the period covered by the certificates.

Mr. Pereira was cross examined and questioned personally and after deliberation on the previous correspondence and the personal explanation offered, the Council decided that Mr. Joseph Michael Pereira had been guilty of infamous conduct in a professional respect and directed the Registrar to erase his name from the Medical Register.

2. Mr. Purshottam Narotam Patel, a registered practitioner, was called before the Council, but stated that he was unable to appear in person or by a legal representative. The Council therefore considered the charge, namely, that he had been convicted by a First Class Magistrate of making a false statement and fabricating his register of patients to support this false statement. On appeal to the Sessions Judge, the conviction was upheld.

The Council decided that Mr. Purshotam Narotam Patel had been guilty of infamous conduct in a professional respect and directed the Registrar to erase his name from the Medical Register.

3. Mr. Dharamdas Kaushalyadas, an unqualified medical practitioner at Bulsar, submitted an application for recognition and registration. This was supported by certificates as to capacity for medical practice signed by Mr. B. M. Khambatta, L.M.S. and Mr. T. C. Khandwala, L.M.S. The Council decided that as the applicant had not had a training in any medical school, he cannot be registered.

Mr. Khambatta and Mr. Khandwala who issued the certificates submitted were warned that their action in associating themselves with an unqualified practitioner was highly irregular [*vide* Ethical Suggestions No. 1 (*e*)].

4. It was decided that the draft of a revised Code of Medical Ethics be circulated to the various medical societies in the Presidency for their opinion and remarks. This will be considered at a subsequent meeting of the Council.

5. An application from Dr. R. H. Bhadkamkar, M.D. (Bom.), whose name was erased from the Register on 17th February 1921, for restoration, was considered.

Dr. Bhadkamkar having given an unqualified assurance that he would sever all connection with Messrs. N. Powell & Co., where he had been acting as Director of their Laboratories, the Council, after due deliberation, decided to permit Dr. Bhadkamkar's name to be restored to the Register.

Reviews.

ATLAS OF THE HISTORY OF MEDICINE. I. ANATOMY.—By Dr. J. G. de Lint. London: H. K. Lewis & Co., Ltd., 1926. Pp. 96. Illustrations 199. Price, 15s. net.

THIS atlas is composed of a series of figures illustrating the history of anatomy and gives a picture of its development from the earliest times to the present day. The authors' aim is to aid the study of anatomy by awakening the memory of the past. They have produced the original drawings made by the anatomists of old days with their own hands whenever possible, and in other cases have reproduced their portraits obtained from title pages of books or other sources. Anatomy forms the basis of medical science. This book, we hope, will stimulate the interest of both students and medical

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practitioners in this subject. It is admirably produced and published.

DISEASES OF THE SKIN.—By James H. Sequeira, M.D. (Lond.), F.R.C.P. (Lond.), F.R.C.S. (Eng.), Fourth Edition. London: J. & A. Churchill, 1927. Pp. 644, with 56 plates in colour and 309 text figures. Price, £2-2-0 net.

THE fourth edition of this well known book on "Diseases of the Skin" by Dr. James Sequeira, has been very much enlarged by numerous additions, particularly of those skin diseases which are found in the tropics. In this respect Dr. Sequeira's book is especially helpful to workers in the tropics and is free from a failing which is common in most of the textbooks on this subject, which are therefore of little use to practitioners in tropical climates.

The coloured illustrations are particularly good, and they number 56, which is very large for a book costing only two guineas. This textbook can be confidently recommended to any student who requires information on the subject of diseases of the skin.

There are two points which could be remedied in the next edition. The literature should be brought up to date, as many of the references on the different skin diseases are only given up to 1914. The section on the anatomy and physiology of the skin is poor, and is covered by 9 pages. The effect of the endocrines on the skin and the recent work of Krogh on its capillaries are not considered at all.

These are suggestions for improvement and are in no way intended to detract from emphasising the great value of the book, which contains a wealth of clinical experience, illustrating the different diseases of the skin.

H. W. A.

BRAIN AND HEART: LECTURES ON PHYSIOLOGY. —By G. Fano. Translated by H. Ingleby. Bombay: Oxford University Press and Constable & Co., 1926. Pp. xv plus 142. Price, 8s. 6d.

THIS book is a collection of lectures given by the author in the Universities of Barcelona and Madrid, and deals with the author's investigation of the broad questions concerned with the functions of the heart and brain. It therefore appeals not only to medical readers, but to others interested in the wider issues of physiology. The author gives an account of his scientific observations in the form of an autobiography and his object has been to investigate the nature of the heart rhythm and the inherent excitability of living matter. He considers that heart and brain are both symbolic of automatism and of the wilfulness of life. He says that living matter differs from dead matter in that it is organised by the 'will to live.' From his experiments on the hearts of frogs and tortoises he draws conclusions, not only regarding the function of these organs, but also speculations on the origin of life and the behaviour of man himself. The author is not only a scientist but also an artist, and as such he combines conjecture and speculation in the field of scientific investigation. He warns his readers however not to exaggerate the importance of theories. The book is a very interesting and philosophic treatise, and should be widely read by medical as well as laymen.

HANDBOOK OF DISEASES OF THE RECTUM.—By Louis J. Hirschman, M.D., F.A.C.S., Professor of Proctology, Detroit College of Medicine, etc. Fourth Edition. St Louis: The C. V. Mosby Co., 1926. Pp. 403, with 252 illustrations and 5 coloured plates. Price, $6.50.

THIS book was published in 1909, with the object of supplying the general practitioner with a short and handy account of the diagnosis of ano-rectal disease and well illustrated instructions for the performance of those operations which can be done under local anæsthesia. The subjects of cancer and all conditions of the rectum and anus requiring operation under general anæsthesia are deliberately excluded. The fact that the work has run through four editions is proof that it fulfilled a need and we consider that it deserves to be more widely known in this country. Hæmorrhoids, fistula and fissure are all very common in India, the sufferers dislike the idea of an operation under anæsthesia and dislike still more the idea of going into hospital, and yet surgeons in India almost invariably treat these conditions by operation under general anæsthesia. They can be dealt with under local anæsthesia in the consulting room, or involve a stay of only a day or two in hospital, and in the United States there is a considerable number of surgeons practising as specialists in proctology on these lines. The advantage to the patient is so obvious that the extension of this field is much to be desired.

The present work will be found to be a reliable guide to this branch of practice. The opening chapter on anatomy is scrappy and the account of the lymphatics of the rectum is not in accordance with modern work. The chapter on examination however is very complete, though we are surprised that the electrically illuminated proctoscope finds no mention. The account of methods of local anæsthesia is excellent and we are glad to see a special section on the limitations of the method and consideration of the classes of case for which it is not suitable.

The rest of the work deals with the various diseases of the rectum very adequately, bearing in mind the limited scope of the book. We note that the author has little use for the injection treatment of hæmorrhoids, which he regards as a clumsy and tedious method, likely to be abandoned, except for a small class of case, when the ease with which a neat ligature operation can be done under local anæsthesia is realised. Anal papillitis is a common disease, almost unrecognised except by specialists, which may cause distressing symptoms and is easily recognised and treated by anyone possessing the knowledge and a few simple instruments.

The last chapters deal with dysentery and are from the pen of Dr. J. L. Jelks. He writes an article more suitable for a medical than a surgical textbook and lets himself go to the length of 9 pages on the subject of flagellate dysentery. He is pessimistic as to the prospects of a case of amœbic dysentery ever being cured by emetine and he makes no mention of Deek's bismuth treatment. But he has a lot of useful advice about topical treatment with and without the sigmoidoscope and the uses of appendicostomy and cæcostomy, subjects of which we hear nothing out here nowadays, though there seems no good reason why as excellent results should not be obtained in India as are claimed in America and elsewhere. The illustrations are numerous and of a high standard, and we cordially recommend this book to practitioners and surgeons.

W. L. H.

A GUIDE TO ANATOMY: FOR STUDENTS OF MEDICAL GYMNASTICS, MASSAGE AND MEDICAL ELECTRICITY.—By E. D. Ewart. Second Edition. London: H. K. Lewis & Co., Ltd., 1926. Pp. 336 plus xiv. Illustrations 97, including 35 Plates, 4 coloured. Price, 12s. 6d. net.

WE are glad to note that Dr. Ewart's little book *A Guide to Anatomy* has reached its second edition. It is certainly an improvement on the first, as a good deal of new matter has been added. The book is admirably adapted for the use of candidates for examinations of the Chartered Society of Massage and Medical Gymnastics. The treatment of the subject-matter is brief, but at the same time clear and lucid all through, leaving out unnecessary details. The illustrations are well chosen and well adapted for the needs of those for whom the book is intended. The list of examination questions at the end will be found very useful.

EXPERIMENTAL PHARMACOLOGY.—By Dr. Hans H. Meyer and Dr. R. Gottlieb. Second Edition in English; translated by V. E. Henderson. London: J. B. Lippincott & Co. Pp. 656. Figures 87, partly in colours and 2 coloured plates. Price, 30s. net. Obtainable from Messrs. Butterworth & Co. (India), Ltd., Calcutta, at Rs. 22-8 net.

THE seventh edition of this classical and interesting textbook in pharmacology which now appears has long

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been awaited. This book deals with the subject in quite a different way to other books. Instead of grouping drugs according to their chemical composition or botanic groups, the author approaches the subject from the point of view of the physiology of organs and shows how these functions may be altered by administration of drugs. The importance of an understanding of the function of organs in pharmacology and in the selection of drugs for therapeutic purposes is fully brought out. The book is brought thoroughly up to date and should be read by all students of pharmacology as well as by all practising physicians.

R. N. C.

THE FUNDAMENTALS OF SCHOOL HEALTH.—By James Kerr, M.A., M.D., D.P.H. London: George Allen & Unwin, Ltd. Pp. 859. Price, 35s. net.

THIS is one of the most interesting books on health that we have read for some time. It covers much more ground than might be guessed from its title. It is a detailed and serious exposition of what education really is, how methods and progress in educative methods should be guided, modified and adapted by a consideration of the physiology and pathology of the developing child. The author has skilfully avoided saying anywhere "The child is father of the man," but the quotation might have been put at the head of every page. Education is of two kinds, the natural and the formal. Natural education is an education by living, whose results and effects are incomparably greater than any school education. Formal education will always be directed mainly to the conventions necessary for civilised life. The chapter on mental development gives a succinct account of present knowledge regarding the functions of the various parts of the nervous system in relation to consciousness of action and control of primary instincts so far as we understand these. The supra-granular layer of the brain cortex is the educatable part of the nervous system and the seat of high intelligence. The gradual acquirement of control of primary emotions and instincts in the growing child and adolescent is accompanied by progressive (and *pari passu*) myelination of the neurones of those parts of the brain whose functions comprise intricate association and inhibition; and a knowledge of the periods when such control may be expected and guided is essential to the serious teacher. To take a simple example, the nerve centres for fine movements of the fingers do not reach their maturity till about the middle of school life; attempts of a child to do writing at an early age result in excessive efforts at stimulation—efforts that overflow, causing facial muscles to twist, the tongue to be protruded, and other contortions. Effort to educate and put in action association and other centres which are not ready for full function may similarly result in emotional overflow, resulting in permanent damage to the higher nervous system. There are still many nerves in the human brain which do not become myelinated throughout life. What nervous possibilities in future races may these not represent? The author admires the English Public School type of education. Mainly it would appear in that it gives the young adult an idea of his place in the social commonwealth, teaches him sinkage of self, gives him control over his emotions, and helps him to face changes in environment with equanimity and fearlessness.

The scientific observations on nutrition, growth, physique, and heredity are recondite and complete. The chapter on tuberculosis reveals the author's views on the duties of the State towards this disease. "If tubercle is an infection purely and simply predisposed to by the debility of over-work and the want of vitality, due to bad housing, poor wages and caused by infection from other persons in the community, it is the duty of the community to come to the aid of the sufferers and relieve them fully and freely without assessment or charges." He thinks the present campaign against the tuberculous cow in England is exaggerated and misdirected zeal. The tubercular cow has attracted attention instead of the tubercular person.

In common with many, the author cites Freud almost as a Darwin of the mental world. His method of psychological analysis in searching for psychical trauma attempts to follow back to the start the tangle of clues behind an action, i.e., to the two great springs of action, self preservation, and race preservation; the ego and the sex instincts. In common with many others he deplores that Freud's discovery should be so overlaid with pseudo-science that its full value is likely to be more depreciated than realised at present. To sex education he devotes but a page—"For the regulation of society it is not instruction in sexual processes that is needed, but instruction in the conventions and manners of society regarding them." At no time should sexual things be treated as hidden or secret, but as an ordinary subject. The only reasonable way is to make knowledge on sexual matters accessible and available, so common that none can miss it—in textbooks, dictionaries, cyclopædias and reference books. Above all, there should on the one hand be no taboo on any of Nature's methods, and on the other hand no foolish sentimentality about the "beauty and sacredness" of sexual things.

The chapters on vision, hearing, ventilation, infectious diseases, aphasia, school cleansing and school sites and buildings are all first rate and embody the result of much experience and observation and wide reading. The book has a much wider appeal than merely to school medical officers—it will interest, stimulate and teach the educationalist and the general practitioner and, if they could but read and understand it, the everyday father and mother.

It is a quotable book and we finish with the following:—"Intelligence is one thing, morality another, and wisdom combines them both in a sound mentality."

A. D. S.

MESENTERIC VASCULAR OCCLUSION: SUPPLEMENTED BY AN APPENDIX OF 76 ORIGINAL CASES.—By A. J. Cokkinis, M.B., B.S. (Lond.), F.R.C.S. (Eng.). London: Bailliere Tindall & Cox, 1926. Figures in the text 5. Pp. xii plus 159. Price, 10s. 6d. net.

THIS little book is a thesis embodying the results of original research on a subject of considerable surgical interest and importance. The author has carried out some interesting experiments by injection and ligature to ascertain the results of blocking of the mesenteric vessels, and has collected and analysed the records of 76 hitherto unpublished cases. His analysis leads him to the conclusion that venous thrombosis is more common than arterial occlusion in the proportion of 75 per cent. to 25 per cent., figures which are in striking contrast to those given by other writers. Sepsis in the territory drained by the mesenteric vein was the commonest cause in this series. The pathology and symptomatology are exhaustively discussed, and it is pointed out that a definite diagnosis can be made in many cases, also that treatment by operation is not so hopeless if it is undertaken within the first few hours; an operative mortality of about 80 per cent. is depressing, but it must be remembered that the condition is invariably fatal if untreated.

This book should remain the last word on the subject for some time to come; it is founded entirely on actual records of cases and not on publications by other people and constitutes a valuable addition to our knowledge of an obscure subject.

W. L. H.

CORRIGENDUM.

IN our issue for November 1926, in our review of Professor Julius Stieglitz's *Chemistry and Recent Progress in Medicine*, the name of the publishers should be the Williams and Wilkins Co., New York, and not as shown. Messrs. Baillière, Tindall and Cox are the British Agents for the Williams and Wilkins Co.

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Vide Journal American Medical Association, March 6th, 1926, page 668.

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Annual Reports.

ANNUAL PUBLIC HEALTH REPORT OF THE CENTRAL PROVINCES AND BERAR FOR THE YEAR 1925. BY LIEUT.-COLONEL H. G. STILES-WEBB, D.P.H., D.T.M. & H. (CAMB.), I.M.S., OFFICIATING DIRECTOR OF PUBLIC HEALTH, CENTRAL PROVINCES, NAGPUR: GOVT. PRESS, 1926. PRICE RS. 4-10-0.

THIS is a report which shows steady progress in all directions, and records an unusually low death-rate.

"The favourable conditions of 1924 continued in the year under review. Although the monsoon was deficient in parts of Berar and the *kharif* crops were consequently affected, there was no lack of rain elsewhere and for the province as a whole, from the point of view of the public health, the year was a satisfactory one. The supply of food-grains was adequate and there were no large fluctuations in prices. There was a good demand for labour and the wages paid were good except that in the cotton districts the marked drop in cotton prices had its inevitable reaction on the prevailing labour rates. The climatic and economic conditions of the year are clearly reflected in the statistics. The death-rate, 27.27 per thousand of population as compared with 32.59 in 1924, was the lowest recorded since 1901. Infant mortality declined to 204.44 per thousand births from 234.94 in the previous year. The birth-rate fell to slightly below that of 1924, but it exceeded the average for the preceding five years by 3.36 and the year was undoubtedly the healthiest on record for many years.

The fact that no less than 10 infants out of every 50 born died during their first year of life indicates the immensity of the problem of infant mortality which awaits solution. It is significant also that throughout the province during the ages of 15 to 30 (i.e., the child-bearing age), the number of female deaths largely exceeded that of males, while for every other age the contrary is the case. Many municipal committees have engaged midwives or female Assistant Medical Officers and Baby Week Celebrations were organized by a number of local bodies. Such celebrations serve a useful purpose in arousing enthusiasm but, as is pointed out in many of the district reports, they will fail in their object unless they give rise to something more permanent, such as the formation, as has successfully been done at Nagpur, of Child Welfare Centres. The annual Baby Show should in fact ultimately become the means of reviewing and advertising the work done in the Welfare Centres during the preceding twelve months. The two Child Welfare Centres maintained by the Nagpur Municipal Committee with the assistance of a Government grant to meet half the expenditure, continued to increase in usefulness and popularity and one more centre was opened towards the end of the year under the auspices of the Red Cross Society. The number of cases visited at these centres has steadily increased from 860 in 1921 to 3,583 in the year under report and the lower mortality among visited cases is very noticeable. It is hoped that the time will not now be long before such centres are established in important towns throughout the province. Government have made a grant of Rs. 20,000 this year to the Red Cross Society for Child Welfare, and propose, subject to the vote of the Legislative Council, making annual grants in future to that society, as it will best be able to guide and foster the movement, at any rate in its early stages.

A number of district reports comment on the necessity for some control over local *dais* and proposals for enabling municipalities at their option to ensure their compulsory registration are now under the consideration of Government. The problem of child welfare, however, will not be solved by legislation and the promulgation of rules alone. It is the education of the people in regard to the elementary principles of hygiene and modern sanitary methods, and the overcoming of the deep-rooted distrust of innovations which conflict with firmly established habits of domestic life, which are of far greater importance, and these can only be achieved by the spread of education and by the local leaders of the people themselves, either as private individuals or as members of local bodies, taking an active and personal interest.

Fevers are again reported as the cause of over 50 per cent. of the deaths occurring during the year. Malaria was prevalent throughout the province, especially in the Chhindwara and Betul districts. Free issues of quinine were made in the poor tracts comprised by the Chhindwara *jagirs*, and the Seoni District Council arranged for its free issue to school children and indigent persons in the malarious tracts of that district. It is regrettable therefore to note that though the price of quinine has not been changed, the issues from the Nagpur Central Jail decreased by 25 per cent. approximately during the year. As was pointed out in last year's report, the possibility of making this prophylactic remedy available at cheaper rates in malarious area is worthy of the consideration of local bodies and it is satisfactory to note the action taken by the Seoni District Council. Small-pox was the only disease which accounted for an increase in deaths and the progressive rise in mortality from this disease since 1923 is rather ominous. In the Amraoti district alone the increase has been from 173 in 1924 to 1,062 in the year under review. Many of the district reports comment on the difficulties experienced by vaccinators outside towns and the urgent necessity for making vaccination compulsory in rural areas. Legislation is involved and the Government is considering the question. There was a decrease in the mortality from plague. Of the 5,223 deaths reported, 3,385 occurred in Berar and 1,230 in the Jubbulpore district. For the first time for many years the epidemic did not recur in the autumn in Jubbulpore town, and as this event coincided with the starting of a rat destruction campaign towards the end of the previous year the committee will doubtless be encouraged to pursue their efforts with renewed vigour. The experience of the Nagpur Municipal Committee over a series of years seems to warrant the conclusion that, if rat destruction cannot confer complete immunity, the possibility of a rapidly spreading epidemic is at any rate minimized. It is satisfactory to note that a number of municipal committees are taking an increased interest in this matter. Recurring grants-in-aid were made to three municipal committees during the year and other local bodies which are seriously tackling the question may expect to receive similar assistance. Too much emphasis cannot be laid on the fact that half-hearted measures are useless and the minimum standard to be aimed at is a proportion of 100 rats per annum per hundred of population. Since the close of the year, the rate of 50 rats annually per hundred of population has been fixed by Government as an absolute minimum standard and grants to local bodies will only be made subject to this standard being reached.

The number of epidemic dispensaries fell from 31 to 29 owing to the Wardha District Council having ceased to contribute to the maintenance of two dispensaries in that district. One dispensary was maintained by the Bilaspur District Council. The remaining 28 assistant medical officers visited 5,458 villages and treated 95,190 patients as compared with 4,511 villages visited and 60,093 patients treated during 1924. Eleven thousand two hundred and eighty-nine plague and 80 cholera inoculations were performed. In the absence of epidemics the dispensaries were engaged in health propaganda, the inspection of school children and the checking of vital statistics. The proper training of assistant medical officers for epidemic work must await the materialisation of the project for a public health institute for the province.

An appeal was made by His Excellency the Governor during the year on behalf of the Leprosy Relief Association. A provincial committee and district committees were formed and approximately two lakhs of rupees collected. Some of the district reports in tracts where this disease is prevalent express dissatisfaction with the

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steps taken to deal with the problem locally, in response to the funds so liberally collected in the previous year. The covering government resolution emphasises that it is in the interest of the province that research work at the Central Institute should be energetically prosecuted and that the major portion of the funds collected in all provinces should be allotted to this purpose, but would still like to see greater energy displayed in grappling with the disease in affected areas. The Deputy Commissioner, Amraoti, points out that as it is in the early stages of the disease that the effects of treatment are most marked and efficacious and that as people though not adverse to treatment, will not go long distances or stay at central asylums for long periods in order to receive it, it is imperative that as many local assistant medical officers as possible should receive training in leprosy at Calcutta and on their return administer that treatment at their dispensaries. The Governor in Council is considering the question of taking action along these lines, beginning with tracts like the Chhattisgarh division and the Amraoti district where the disease appears to be especially widespread.

The failure of many municipal committees to appreciate the importance of registration of vital statistics is the subject of adverse comment in the report. Grants amounting in all to Rs. 2,11,548 were made by Government to municipal committees for sanitary works. Municipal committees spent 39 per cent. of their total income on health purposes as compared with 34 per cent. during the previous year. The proportion is still low and a further increase of expenditure on measures connected with public health, the maintenance of which is the first duty of municipal committees, is overdue, but there has been some improvement in this respect during the year.

REPORT ON THE PUBLIC HEALTH ADMINISTRATION OF THE PUNJAB FOR 1925. BY LIEUT.-COL. W. H. C. FORSTER, D.P.H., I.M.S., DIRECTOR OF PUBLIC HEALTH, PUNJAB. LAHORE, SUPDT., GOVT. PRINTING, PUNJAB, 1926. PRICE RS. 2-2-0.

IN spite of unfavourable climatic conditions, the year 1925 was one of the healthiest recorded in the Punjab. Rainfall was in defect and food prices higher than in normal years; yet there was a complete absence of any great epidemic or of the prevalence of epidemic diseases on a large scale.

The estimated population for the year was 21,433,691 and—as usual—the Punjab returned a high birth-rate 38.4 per mille on the estimated population. Epidemic disease in the Punjab is especially affected by climatic conditions, and a rainfall distribution favourable to plague and malaria is sufficient to cause soaring of the death-rate. In 1925, the critical December-May rainfall was unfavourable to plague with correspondingly favourable results. The distribution of the rainfall was also unfavourable to malaria, with a consequent drop in the fever death-rate as compared with the previous year.

The male birth-rate exceeded that of females, 111.9 males being born as against 100 females. The Punjab has the second highest birth-rate in India, being only surpassed by the Central Provinces. In Lahore town, the birth-rate shewed a falling off, due to the incidence of plague amongst women of child-bearing age. The excess of births over deaths stood at 10.1 per mille of the census population, as compared with a deficit of 3.3 in the previous year. These figures alone emphasise the dependence of the health of the Punjab on climatic conditions, and the general virility of its peoples in the absence of any severe epidemic; also the inherent powers of recovery of the Province after severe epidemics. The death-rate, 30.0 per mille, was not only 13.4 per mille less than that for the previous year, but also less than that for the previous quinquennium. Infant mortality dropped from 209.6 per mille in 1924 to 185.1 per mille in 1925, but still constituted one-quarter of the total mortality in the Province. The system of registration of births and deaths by *patwaris* instead of by *chaukidars* in rural areas, tentatively introduced in the districts of the Lahore division, was in operation throughout the year. The final reports on this system shew that the *thanewar* system of reporting vital statistics of rural areas is on the whole easier to work, cheaper, and not less accurate than the *patwari* system. Hence a return to the older system has been ordered.

Turning to the chief diseases, cholera assumed epidemic proportions of moderate severity during the year, accounted for 3,049 deaths as against 3,351 in the previous year, and a mortality of 0.15 per mille. The disease prevailed in 23 out of the 29 districts in the Province and Shahpur, Jhelum and Gurgaon were chiefly attacked. The disease appeared first in April and was definitely traced to importation of infection at the Katas fair in the Jhelum district. Within the short space of 10 days no less than 11 districts had become infected. This infection lingered on till June, when a fresh infection was imported from the United Provinces into the extreme south-east of the Punjab and was prevalent there until the end of October. The water supply arrangements at the Katas fair are primitive, the district board incapable of financing a proper water-supply, and roadside sources of water open to the greatest pollution. Arrangements had been made by the Public Health Department to cope with the sanitary needs of 15,000 people at the fair, but 50,000 attended it and the arrangements broke down. "Our fairs are a chronic danger and will remain so until the general sanitation of fair grounds is placed under some central and competent authority" writes Colonel Forster; "district boards and other local authorities are financially and administratively incapable of dealing with the matter."

Small-pox shewed an increase of 7,038 deaths as compared with 4,040 in 1924. The maximum mortality occurred in June with a secondary rise in the curve of incidence in December. There is now a large unprotected and susceptible population in the Punjab, largely as the result of the application of political theories. Extra staff was employed, and vigorous propaganda instituted. "Although the number of cases of small-pox is on the increase" runs the covering Government resolution to the report, "no local body except the municipal committees of Lahore, Amritsar and Simla have opened small-pox hospitals. Simla is the only place where a real effort is made to isolate cases of small-pox. Vigorous efforts are being made by the Public Health Department to make vaccination popular in the absence of statutory provisions requiring the compulsory vaccination of persons."

Plague during 1925 was "comparatively speaking, a very mild affair"; and the plague death-rate in British districts 1.83 per mille as against 12.24 in the previous year and a quinquennial average of 3.10 for the previous 5 years. The disease in 1925 was more prevalent in urban than in rural areas—a contrast to the experience of previous years. Pneumonic outbreaks were reported from Hissar, Rohtak, Lahore, Amritsar, Gujrat, and Attock. The mortality was at its maximum in April. All the usual anti-plague measures were taken, together with intensive measures in carry-over centres during the quiescent period. Inoculations numbered 304,981 during the year—a very satisfactory figure considering the mildness of the year's outbreak; whilst no less than 4,020 lantern lectures on the subject were delivered. It is clear that the population of the Punjab has come to appreciate the value of anti-plague measures.

Fevers as usual caused the greatest mortality—22.04 per mille. The greatest number of deaths was registered under this heading in September. Energetic measures in the Gurgaon district under Mr. F. L. Brayne, the Deputy Commissioner, have been eminently successful, with the result that this district scarcely figures at all in the list of fever mortality rates. Influenza was unimportant during the year, but relapsing fever still lingers in the western districts of the Province. Respiratory diseases accounted for a mortality of 2.65 per mille of the population, and Colonel Forster considers that tuberculosis in the Province is but part of the

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given to prisoners to behave well will produce good results. Incidentally the release of these well behaved prisoners, most of whom were convict officers, has increased the need for more warders.

Useful work has again been done by the Boards of Visitors, especially in drawing the attention of the Inspector-General of Prisons and Government to the needs of their jails. There has, however, been a decrease in the number of individual visits by both official and non-official visitors.

It is a matter for regret that some jails are still without religious instruction. A difficulty in the way of securing honorary teachers has been removed by the provision of a grant for conveyance allowances, and it is hoped that it will now be possible to find such teachers for every jail.

There was a fall in the average earnings of prisoners sentenced to labour from Rs. 74-10 in 1924 to Rs. 67-13. The percentage of prisoners employed in manufactures was slightly higher in 1925 than in 1924, although it was still disappointingly low.

The best manufacturing work appears to have been done at the Dacca Central Jail where the woollen factory has been successful.

Correspondence.

SUSPENDED ANIMATION.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—I was recently with a friend of mine, when a discussion arose as to how long breathing could be suspended. He told me that he could voluntarily suspend his breathing for twenty-five minutes and asked me to test him. I had no watch with me at the time, but I think that for at least ten minutes he was able to voluntarily suspend his breathing. He then stated that he could also control his heart beat. I placed my fingers on his pulse, and the pulse became gradually weaker and weaker, whilst his face began to change in colour, and assumed a death-like facies. Ultimately the pulse was almost imperceptible. I was fully satisfied as to his ability to control his heart beat voluntarily, and got somewhat nervous and asked him to stop the experiment. He wrote on a bit of paper near him "I am not dead, I am in *samadhi*. Don't burn my body. I shall come round."

Breathing exercises are highly spoken of as a general tonic and curative in some diseases, but practice in them should be gradual and the nose should not be held by the hand. This science is known as "pranvidya" by the Ayurveds; and the control of the breathing should be by the will and not forcibly by physical means. Can any of your readers give me further information on the subject? One knows quite well that such practices are in vogue amongst Indian mystics and others; but it would be interesting to learn details as to the powers of what one may term "voluntary catalepsy."—Yours, etc.,

RUDRA DUTT, L.M.S.,
Assistant Surgeon.

CIVIL HOSPITAL,
MAILSI, PUNJAB.
14th November, 1926.

Service Notes.

APPOINTMENTS AND TRANSFERS.

Lieutenant-Colonel J. W. Watson, C.I.E., I.M.S., an Agency Surgeon, on return from leave, is posted as Civil Surgeon, Ajmer and Chief Medical Officer in Rajputana, with effect from the 17th November 1926.

Lieutenant-Colonel N. M. Wilson, O.B.E., I.M.S., Civil Surgeon, Simla, West, is appointed to hold charge of the duties of the Civil Surgeon, Simla, East, in addition to his own, during the absence on leave of Lieutenant-Colonel Macmillan.

Lieutenant-Colonel T. C. McCombie Young, M.D., I.M.S., is placed on foreign service under the Indian Research Fund Association with effect from the date on which he assumes charges of his duties.

The services of Major K. R. Batra, I.M.S., are placed temporarily at the disposal of the Government of the Punjab with effect from the date he assumes charge of his duties.

Major K. S. Thakur, I.M.S., is appointed to act as Civil Surgeon and is posted to Bakarganj.

Major P. F. Gow, D.S.O., M.B., I.M.S., is appointed to act as Second Professor of Midwifery and Gynæcology, Medical College, Calcutta, with effect from the afternoon of the 6th November 1926.

Captain R. M. Kharegat, I.M.S., an Officiating Agency Surgeon, is appointed to be additional Civil Surgeon, Ajmer, with effect from the 17th November 1926.

Captain J. C. Chakravarty, I.M.S., Resident Physician, Medical College Hospitals, Calcutta, is appointed to act in addition to his own duties, as Resident Surgeon, Medical College Hospitals, during the absence on leave of Major P. C. Banerji, I.M.S.

Captain J. C. Chakravarty, M.B., I.M.S., is placed on general duty at the Medical College Hospitals, Calcutta, with effect from the forenoon of the 13th November 1926.

LEAVE.

In modification of Education, Health and Lands Department Notification No. 1472-Health, dated 25th October 1926, Colonel A. W. R. Cochrane, M.B., F.R.C.S., I.M.S., Inspector-General of Civil Hospitals, United Provinces, is granted leave on average pay for 5 months and 28 days combined with leave on half average pay for 1 year 10 months and 2 days with effect from the 9th October 1926.

Lieutenant-Colonel A. C. MacGilchrist, I.M.S., Professor of Physiology, Medical College, Calcutta, is granted leave on average pay for three and a half months, under rule 81 (*b*) (*i*) of the Fundamental Rules, with effect from the 15th December 1926, or from any subsequent date on which he may avail himself of it.

Lieutenant-Colonel J. M. A. Macmillan, M.D., F.R.C.S., I.M.S., Civil Surgeon, Simla, East, is granted leave on average pay for one month and a half with effect from the 20th December 1926 or subsequent date on which he may avail himself of it.

Major E. W. O'G. Kirwan, F.R.C.S.I., I.M.S., Officiating Civil Surgeon, Mymensingh, is granted leave on average pay for four months, with effect from the 3rd January 1927.

PROMOTIONS.

Lieutenant-Colonel to be Colonel.

Lieutenant-Colonel G. Tate, M.B., V.H.S., *vice* Colonel A. W. R. Cochrane, M.B., F.R.C.S., dated 9th November 1926.

Major to be Lieutenant-Colonel.

William Cowan Gray, M.B. Dated 1st March 1925.

The promotion of Major F. Griffith, M.B., notified in Army Department Notification No. 1253, dated the 1st October 1926 is antedated from the 8th September 1926 to 8th March 1926.

Captains to be Majors.

Bindeshwari Prasad, M.B. Dated 2nd December 1926.
John Marsters Mitchell, O.B.E., M.B. Dated 13th December 1926.
Codanda Madiah Ganapathy, M.C., M.B. Dated 14th December 1926.
Nariman Jamshedji Gai, M.B. Dated 20th December 1926.
B. Z. Shah. Dated 5th November 1926.
A. J. D'Souza, M.C. Dated 5th November 1926.
R. H. Malone, M.D. Dated 6th November 1926.
V. N. Agate, M.B. Dated 11th November 1926.
J. P. Canteenwalla. Dated 15th November 1926.

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L. S. Modi, F.R.C.S.I. Dated 15th November 1926.
S. N. Mukerji, F.R.C.S.E. Dated 20th November 1926.
B. C. Ashton, M.B. Dated 23rd November 1926.
M. S. Joshi. Dated 24th November 1926.
K. B. Bharucha. Dated 26th November 1926
E. R Daboo, M.C. Dated 26th November 1926.
H. S. Anand. Dated 26th November 1926.
B. G. Mallya. Dated 26th November 1926.
B. H. Kamakaka, M.C. Dated 29th November 1926.

RETIREMENTS.

Colonel J. H. McDonald, M.B., K.H.P. Dated 1st November 1926.

Lieutenant-Colonel D. McCay, M.B. Dated 1st November 1926.

Lieutenant-Colonel H. M. Brown, M.B. Dated 6th November 1926.

NOTES.

MESSRS. ALLEN AND HANBURYS.

A REPRESENTATIVE of Allen & Hanburys, Mr. B. W. Clark, is making a prolonged visit to India for the purpose of displaying to hospitals and surgeons generally the company's productions in the way of surgical instruments and also to study local conditions. It is not generally known that this well known house manufactures instruments and apparatus of the finest quality and of the latest and most up-to-date patterns. The representative who will be in India for some years will tour the whole of the country gradually and will be visiting the principal cities in India, starting from Bombay and Karachi and then visiting the North and North-West previous to going South.

Any medical men interested should write to Allen & Hanburys, Ltd., Block "E," Clive Buildings, Calcutta.

INDEX OF THERAPEUTICS AND MATERIA MEDICA.

(Issued by the Bombay Branch of Parke Davis and Co. 1927.)

THIS most handy little volume is issued free to medical men upon request from Messrs. Parke Davis and Co., P. O. Box 88, and Lloyd Building, Bombay; also to the dental and veterinary professions. Those asking for it, however, should be careful to add their professional qualifications. In addition to much useful information on treatment, dosage, diets, incompatibles, weights and measures and biological products such as sera, vaccines, phylacogens, tuberculins, etc., and appliances, it contains a full list of the high grade drugs, hypodermic syringes, etc., issued by the firm. It is also most interestingly illustrated.

WATSON AND SONS' CATALOGUE OF MICROSCOPES.

MESSRS. W. WATSON AND SONS, 313, High Holborn, London, W. C. 1, have recently issued a new edition—the 31st—of their catalogue of microscopes and accessories. The catalogue is a most fascinating one to look through, and will appeal to every type of reader, both to the student in search of a cheap but reliable microscope, where the "Service" microscope is hard to beat, and to the research worker, who will find such models described as the magnificent grand model "Van Heurck" microscope, with every conceivable fitting, apparatus for the use of ultra-violet light in micro-photography; and the new, wonderful Chambers' microscope dissecting apparatus, with which all objectives up to the 1/12th in. oil immersion may be used, and with which the nucleus of a cell may be cut out, or a single bacillus or protozoon isolated. The catalogue is one of the completest and most interesting that we have seen for many years, and contains much scattered useful information as to choice of objectives and eyepieces, apochromats, etc. One special feature of many or most of Watson and Sons' microscopes is that the substage condenser possesses centering screws, and every worker of experience will know how much that adds to the efficiency of a microscope.

In addition there is included in the catalogue a list of second-hand microscopes and accessories available; also a copy of the issue of their *Microscope Record* for September, 1926, which contains a very interesting article by Mr. W. B. Stokes, formerly for many years Honorary Secretary of the Quekett Club, on the resolving power of the microscope, and a most thoughtful article by Mr. A. Coper on microscope construction. This journal is issued to laboratory workers upon application, and is always most informative and useful.

Perhaps one of the most interesting bits of apparatus manufactured by Messrs. Watson and Sons is their "Cassegrain" dark ground illuminator, one of the finest dark ground apparatuses ever designed, and suitable for use with any objective from 8 mm. to 2 mm. of 1.4 N.A., without any funnel stop or special illuminant. It is issued at £3-17-6, also with a special mount at £1-15-0 which provides centering screws.

Both the catalogue and the *Microscope Record* are worthy of a firm which is the largest and one of the best known firms of microscope makers in the Great Britain.

OGILVY'S CATALOGUE OF MICROSCOPICAL ILLUMINATING APPARATUS.

THOSE who had the pleasure of listening some 16 months ago or so to a lecture delivered in Calcutta by Mr. Ogilvy, will not soon forget the wonderful display which he gave at that lecture of different types of illuminating apparatus for the microscope, or of the fascinating suggestions which he made as to future developments in microscope construction. Hence it is with special pleasure that we welcome the issue by Ogilvy and Co., 20, Mortimer Street, London, W. 1, of a new catalogue of microscopical illuminating apparatus. The firm are themselves makers of microscopes and microscopic accessories, and also are the British agents for Leitz and Co.

The experienced microscope worker—even in the tropics—always comes in the long run to rely upon artificial illumination in preference to daylight, and there is no question that it enables one to see far more detail. For protozoological work it is almost essential. In this catalogue will be found lamps suitable for every type of worker, all of them designed for the electric current. For the student and for routine work the model No. 03 vertical lamp should prove most suitable, and costs £2-2-0 only; whilst a much higher class lamp with a condensing system and light filters, suitable for research work, is listed at £15-15-0. The Hartridge-Williams axial illuminator is an ideal illuminant; it is slipped into place instead of the microscope mirror, and gives truly axial, centered, illumination, the intensity of which can be adjusted to any extent by an iris diaphragm in the lamp. This makes the microscope at once self-contained; it can be used anywhere at any time and either in the vertical or the tilted position. Projection and "Pointolite" lamps are also fully described; whilst another most ingenious novelty is the "Silverman illuminator." This is an illuminating apparatus to fit around the objective of the microscope and throws light downwards on to a solid object. Mercury vapour lamps for ultra-violet rays, etc., are also described, and an admirable simple pattern of micro-projection apparatus which is similar to a pattern which the reviewer has been using for years and has found to be most satisfactory. In this the microscope is set horizontally, a beam from a special projection lamp is passed through the condenser, and slide, and reflected by a mirror fitted to the eyepiece of the microscope on to a flat drawing surface. With a folding screen, one can easily use the oil immersion lens with this outfit; and its advantage to professors and teachers who have to prepare histological or pathological diagrams, etc., for classes is very great. The outlines of the structures within the microscope field can be traced straight away, and if very fine detail is wanted, the microscope can then be set tilted, and the

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detail studied by the eye and filled in on the sketch. This apparatus is one which we would like especially to bring to the notice of teachers of histology and pathology.

The whole catalogue is one which will deeply interest laboratory workers, whilst the admirable workmanship of the firm ensures that their lamps are absolutely reliable. We have had two Ogilvy lamps in use for more than two years now, and have not even required to renew a bulb.

KINAZYME, CARNICK AND CO.

AN interesting new preparation is Kinazyme, prepared by Carnick and Co., the well-known manufacturers of glandular and endocrine products. This is a combination of gland substance—spleen, pancreas, pituitary, and parathyroid—and it is claimed that it is of special value in the treatment of tuberculosis and other wasting diseases. The oral administration of spleen substance increases the number of red blood corpuscles; pancreas substance is used to improve digestion; pituitary substance may give a slight impetus to general metabolism; whilst parathyroid substance has definitely been established as the chief factor in maintaining the normal level of the calcium content of the blood. Hence there may be a very wide range of tropical diseases where such a preparation may prove useful; chronic malaria, chronic dysentery, sprue, the anæmias and cachexias of the tropics, and tropical neurasthenia. The importance of studying endocrine functions in tropical diseases has hardly yet been sufficiently realised by the medical profession in the tropics, but there is already accumulating evidence that endocrine deficiency may be a most important factor in connection with many of the more chronic forms of tropical disease.

SCHERING'S PREPARATIONS.

SCHERING'S medical preparations are so well known in India that they call for little comment; but three of them may perhaps be especially noted on. The first is "Insulin-Schering." Doubts have been thrown upon the keeping properties of insulin in the tropics, and this preparation is put up in the most ingenious containers. It is a white powder, prepared according to the directions of the Toronto Committee, under the control of the German Insulin Committee, and standardised in accordance with the usual international unit. Such a dried preparation will keep indefinitely. The powder is contained in a little tube which is placed inside the rubber cap of a sterile phial containing sterile water. When it is wanted for use, pressure on the outer surface of the rubber cap drives the small tube into the fluid, where it dissolves, and the insulin solution is then ready for use, and can be aspirated into the syringe, just as is a vaccine from a rubber capped container. In this way, the insulin is kept dry and potent under tropical conditions until the moment when it is wanted for use. This novel method of putting up a drug liable to deterioration under tropical conditions is one of the most ingenious which we have seen, and we should like to see its use extended, e.g., to digitalis and other such preparations.

"Veramon-Schering" is a combination of analgesic drugs, the action of each of which reinforces that of the other by acting on different cerebral levels. It has been before the medical profession for three years, and reports by surgeons, dentists, ophthalmologists, and others speak of its value, its freedom from toxicity, and from habit-formation. It has also been largely used for the relief of dysmennorrhœa. The dose is 6 to 12 grains (one or two tablets). A minor, but useful, field of therapy is its administration before a minor dental operation such as an extraction or a filling, when it will quieten the patient and relieved nervousness.

"Krysolgan-Schering" is a gold preparation for intravenous administration in tuberculosis of all forms. It is the sodium salt of amino-auro-thio-phenol-carbonic acid, and characterised chemically by a very firm combination of the gold in the benzol nucleus, so that in aqueous solution it fails to give the ordinary reactions of the gold ion. The dose is from 0.01 gramme to 0.1 gramme, dissolved in sterile distilled water and given intravenously; starting with a very minute dose, the injections are given every 8 to 20 days until the patient has been worked up to 0.1 gramme or less. Earlier workers reported that the action of Krysolgan was like that of tuberculin, and tried to obtain a positive febrile reaction; but later ones report that it is better to avoid febrile reactions and to keep the dosage low, especially in pulmonary tuberculosis. Koch was the first, we believe, to advocate gold therapy in tuberculosis, whilst Feldt and Speiss investigated its action further. Kolbmann and Wiesner report on 180 case of phthisis treated for three months or more with Krysolgan, of whom they considered 103 to have received distinct benefit, whilst Schneider of Coblenz treated 40 cases of whom 14 were markedly improved. We are only probably at the commencement of the study of the possible role of colloidal solutions of the heavy metals in tubercular and allied infections, but Krysolgan appears to be an interesting compound. Many of those who have used it note especially that it has no toxic action on the kidneys.

The Indian agent for Schering's preparations is Richard Schenk, 20-1, Lal Bazar Street, Calcutta.

RUSSIAN SANTONIN.

IN our comment on p. 580 of our issue for November, 1926, on Russian santonin, we gave Messrs. Turnbull Bros. of Calcutta as the Indian agents for the Eastern and Russian Trading Co., manufacturers of santonin. We are now asked to state that Messrs. Turnbull Bros. are the agents for Calcutta, whilst Messrs. G. S. Mahommed, 164, Samual Street, Bombay, are the agents for Bombay.

MELLIN'S FOOD 1927 CALENDAR.

WE have received—unfortunately too late for notice in our issue for January 1927—a copy of Mellin's Food calendar for 1927. This shows a very charming baby, with the legend "Who said Mellin's Food ?" and is an attractive ornament for the desk or consulting room. The Indian agents are Messrs. Mackenzie Lyall and Co., 5, Mission Row, Calcutta; who will be glad to issue copies of the calendar gratis to the first five hundred applicants mentioning this journal.

Publishers' Notice.

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Original Articles.

INTRACAPSULAR EXTRACTION OF CATARACT, INCLUDING THE MOST RECENT ADVANCES.*

By HENRY SMITH, C.I.E.,

LIEUT.-COLONEL, I.M.S. (Retired).

(*Note.*—The illustrations to this article have been taken from an article by the same author in Knapp's *Archives of Ophthalmology*, Vol. IV, No. 3, 1926, to which journal full acknowledgments are due.—ED., *I. M. G.*)

IN opening a discussion on this subject we have to touch on a variety of grounds which is before the profession to-day and is likely to be so for some time to come. I do not propose to touch on Pagenstecker and on those who preceded him. Their procedures are as dead as if they had never been. They are not likely to be resurrected. They are but of historic interest. They merely shew that intracapsular extraction has been the ambition of all surgeons since cataract extraction commenced.

Two methods hold the field—expression from without, and *expression* or extraction from within the eye. Expression from without in point of time takes precedence: it has been developed from the very beginning by the Indian Medical Service. Macnamara of Calcutta commenced it in 1864. He describes his method in the three editions of his book—1st edition, 1868, and 3rd edition 1884—as follows:—

"The object we have in view in this proceeding is to remove the lens without opening its capsule. The advantages it offers are that no capsular cataract can possibly form, and there is no chance of any soft lenticular matter being left clinging to the iris and setting up irritation and inflammation in that delicate structure.

"Atropine having been applied so as fully to dilate the pupil, the patient is to be laid on his back and chloroform administered: (there was no cocaine in those days). The surgeon standing by the side of his patient applies the stop speculum; and the eye being fixed with a pair of forceps, a flap is to be made through the lower section of the sclerotic immediately beyond the margin of the cornea, the same precautions being taken as I have already described in the case of ordinary flap extraction. A portion of the lower part of the iris is then to be excised, and gentle pressure exercised with the curette upon the lower part of the sclerotic and at the same time pressure is to be made with the point of the finger upon the upper part of the eyeball. In this way the lens in its capsule may be forced out of the eye. If the lens is not rapidly displaced upon slight pressure being made upon the globe of the eye, the curette may be inserted behind it and a gentle traction exerted on the lens so as to start it from its position.

"In making the flap we must keep slightly external to the margin of the cornea, so as to leave as large an opening as possible through which the lens may escape, its bulk when contained within the capsule being considerable.

"This operation is no doubt a very valuable one and often leads to most favourable results. Even though there is a difficulty in extraction of the lens in its capsule the latter may be opened, and the operation completed as an ordinary flap extraction: in fact, it will be always advisable to resort to this proceeding unless the lens and capsule are forced through the section in the cornea upon slight pressure being made on the eyeball: any extra force is likely to squeeze out a considerable quantity of the vitreous."

Wright of Colombus, Ohio, published a paper in 1884 and another recently in Fisher's book on *Cataract* on this subject.

Many of his countrymen claim for him precedence. Let such compare his papers with the above quotation and they will see that Wright's procedure is exactly the same as Macnamara's except that Wright is not so courageous in that he does not insert the curette in case the lens is not coming easily.

No doubt a coincidence, though Macnamara's book was read the world over by ophthalmologists. It was the foremost book of its time. It was larger than any treatise on medicine in the sixties and more condensed.

Next in time comes Col. Mulroney, I.M.S. His method was essentially the same as Macnamara's (*vide* Rai Bahadur Mehr Chand's paper in the *Proceedings of the Indian Medical Congress* of 1894). But to Mulroney belongs the credit of extending the method to all senile cataracts.

As far as I can see the method would have ended with Mulroney, as he never wrote a paper on the subject, had someone else not come on the scene. I happened to be that someone. I developed a technique radically different from anything which preceded me except in the fact that the essential expression was maintained. My predecessors, if a difficulty arose, were at the mercy of the patient. Difficulties *do* arise and under the circumstances the patient does not show us much mercy. I wrote up the case repeatedly;

* A paper read at the *Oxford Ophthalmological Congress*, 1926.

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I induced controversy and held the field against all comers. I incurred no end of hatred for doing so from the opposing school. It is a pleasure to be worth hating. The profession began to think; the outcome of this is the many methods of extraction by forceps, pneumatic and other, which appear in the field to-day.

Forceps, pneumatic and other.

I think the earliest extensive operator by the forceps method was the late Dr. Stancelaneau of Bucharest.

His method was to get hold of the capsule with a special forceps and simply to haul it out. Often a piece of capsule came instead of the lens. In this case it was finished as a capsulotomy operation, but not always. I was informed by a reliable member of the profession who paid him a visit pre-war that he left many of such lenses in the eye. A great objection to the method is the liability to pull a piece out of the capsule and the certainty of doing so in the case of every Morgagnian cataract. Such are all the Kalt forceps proceedings except Knapp's, i.e., simply to haul out the lens by the grip on its capsule. Knapp on a visit to me was greatly struck by the ease and safety with which the Morgagnian or soft cataract could be expressed if made to turn a summersault and come out lower edge foremost, (*vide* Fig. 1),

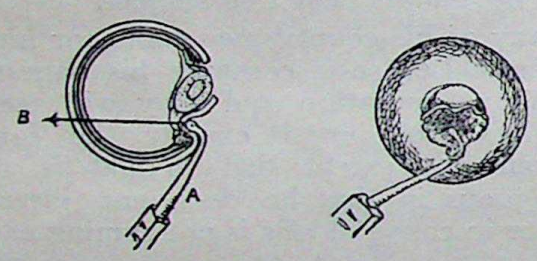

FIG. 1.—THE DELIVERY OF THE SOFT (MORGAGNIAN) CATARACT AS A "TUMBLER" LOWER EDGE FIRST.

The point of the lens hook is twisted backward and downward until it gets a grip on the sclero-corneal ring. It is then used to pull the eye toward the patient's feet (arrow A), sufficient backward pressure to prevent it slipping being kept up (arrow B). The lens dislocates below at once and rolls up under the point on the lens hook, remaining attached to the suspensory ligament above.

and put the principle into practice with his capsule forceps. He gets hold of the capsule near its lower border and either dislocates the lens there first or brings a piece of the capsule with him. If the former he withdraws his forceps and expresses the lens as a "tumbler" by pressure with a squint hook over the sclero-cornea. He thus obtains the same security from escape of vitreous with the hard as well as with the soft lens.

I suggested to him when he got the forceps grip to use the squint hook on the exterior at the same time to assist in dislocation and thus be less liable to tear the capsule. I have recently heard from him that he tried the squint hook thus and that he is very pleased with the result.

In my tour in the U. S. A. and in Canada in 1921 everywhere I advised those using Barraquer's apparatus and the Kalt forceps method to use the squint hook thus to assist in dislocating the lens. The Greens use Barraquer's instrument in this way. How much extraction and how much expression is in the result it would be difficult to say. The Greens were highly skilled with the squint hook before they commenced Barraquer's proceeding.

Early in my experience I tried to make the hard lens tumble solely by pressure from without (placing the squint hook over the sclerotic for the purpose) after I had succeeded in making the Morgagnian cataract do so, knowing that if successful the risk of escape of vitreous in the hands of the average operator would be negligible. Unfortunately I had two cases of expulsive choroidal hæmorrhage in about 50 cases on the first day, and stopped, attributing these cases to the method.

I published a paper at the time in the *Indian Medical Gazette* stating these facts, but I now find that I was mistaken in my judgment and have reverted to the method. It is successful beyond my expectations. It is so simple that anyone with a little experience of ophthalmic operating should find no difficulty with it. The operator is master of the situation with the most difficult hard senile cataract (*vide* Fig. 2).

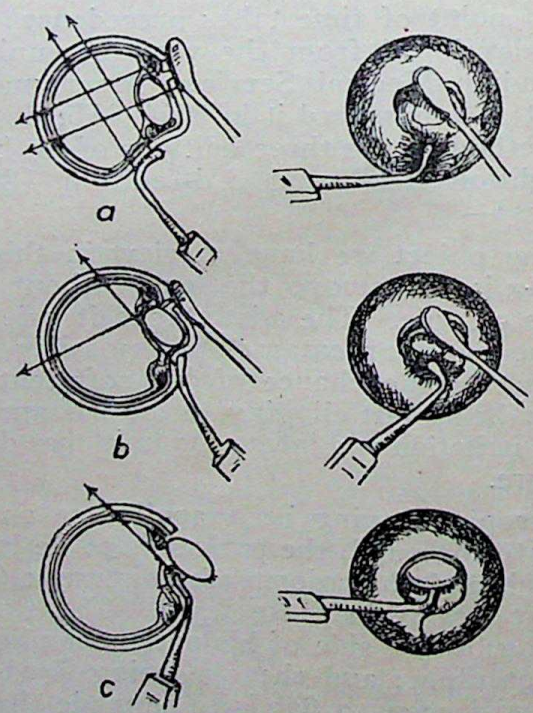

FIG. 2.—THE DELIVERY OF THE HARD CATARACT AS A TUMBLER.

In Fig. (*a*) the upper edge of the lens is prevented from moving forward by spoon pressure over the wound while its lower edge is driven forward by the hydrostatic pressure of the vitreous, raised with the lens hook over the sclerotic. In Fig. (*b*) the suspensory ligament has been torn from the lens below and the point of the lens hook has been slipped up on to the cornea behind the advancing lower edge, while in Fig. (*c*) the spoon has been lifted off the wound and the cornea is being tucked in behind the lens.

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These are big claims, but I am absolutely satisfied that time will justify every one of them.

A friend wrote to me—"The combined pressure method gives one such a sense of security. I did a pair of cataracts in a young man recently which took some shifting. I expect if they heard of it ..... would erase me from the registers."

I am absolutely confident that it is destined to supplant all other methods of dealing with the hard senile cataract, whether by capsulotomy, Kalt forceps, Barraquer's method, or the method which I formerly adopted. It does not require extensive training, and gets over the bugbear of escape of vitreous. It gives the operator confidence that he is not going to be landed in difficulties and to have to change horses in midstream—the most disheartening of all things to a comparatively unskilled surgeon: it requires no special or complicated instrument, liable to go out of order at the wrong moment.

Before concluding I wish to deal with the operation practised by Barraquer.

In his most recent article—Fisher's *Senile Cataract* (1923)—he says:—

"Considering the extremes in the methods that I wish to criticise, it is easily seen that the defects of those techniques consist in leaving the remains of the lesion in the interior of the eye or in producing ectopias and traumatism in the intra-ocular organs, and that the ideal method consists in cutting the zonula and drawing the entire cataract with gentleness to the exterior without either pressure, stretching, or violence."

Phacerosis consists in drawing the crystalline lens by its anterior surface, separating it mechanically without either traction or violence of the zonula, and extracting it completely out of the eyeball without having produced ectopias or traumatism to the intra-ocular structures. The instrument employed called the Erisifaco is nothing more than a pneumatic forceps and a zonulatome.

Later on in the same article—Fisher's *Senile Cataract* (1923)—he says, "Do not think the Erisifaco is an instrument which automatically removes the cataract."

In his article in *La Clinique Ophthalmologique*, written in April 1919, he gives statistics of his first thousand cases:—

Hernia of the vitreous	7	cases.
Inversions of the flap	2	,,
Ruptures of capsules	4	,,
Dislocations of the lens	3	,,
Infections	2	,,
Prolapse of iris	7	,,
Hæmorrhage of the anterior chamber	5	,,
Incarcerations of the zonule	5	,,
Expulsive hæmorrhage	1	,,

Of these 1,000 cases:—

219 were simple extractions
530 with a Hess' iridectomy
251 with an ordinary iridectomy.

Taken on its face value this is all very seductive. A violent act without violence! And what results! How many have been seduced and have tried the method? Not a single man has succeeded except Barraquer himself. No one may question the fact that Barraquer can do it and do it well and that he gets good results. What is the explanation? The explanation is in my opinion that his would-be followers implicitly followed his instructions in every detail. In doing so they discovered that the *Erisifaco* is truly not an instrument "which automatically removes the cataract."

I will not admit that many of those who failed do not possess as good hands and are not as able men as Barraquer.

He directs them to make an incision of 144 degrees. 190 to 200 is the proper incision for Barraquer's operation. 144 degrees is impossible. We have to remember that *the lens and an instrument* have to come out of this wound. He gives diagrams of the lens after removal by expression or by Kalt forceps methods which are absolutely untrue to fact, showing that we tear out the zonula with the lens. I defy any man to demonstrate this fact. He says that this "magic box" acts in some way as a zonulatome and if not properly regulated brings out similar tags of zonule. This again I say is not fact. I defy him to demonstrate it. His observations are done on post-mortem human cataractous eyes. Where does he get them?

The instructions he lays down about regulating the instrument are inconsistent with themselves as any student of physics will at once observe.

I refuse to admit that there is any magic in his "vibrations." It is simply a vacuum forceps. Where in my opinion his would-be followers have failed chiefly is in "gently drawing out the lens" as the name of the instrument would indicate.

A friend of mine recently saw him do a cataract in a child successfully. The instrument has not 1|20th part of the power necessary to do this, for the lens in a child is at least ten times more firmly anchored than a senile cataract. In fact the instrument has only power enough to draw out an occasional senile cataract which happens to be very lightly anchored. What is the explanation? He is in my opinion dislocating the lens by pushing it straight backward and when dislocated completely rolling it over on its back and pushing it forward through the pupil with

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the instrument right behind it. The instrument has ample power for this purpose because it has only to keep contact with the lens, no traction being exerted upon it. I thus challenge the whole of his instructions and say that his would-be followers would be well advised to throw them overboard completely and to exercise their own untrammelled judgment, and I have no doubt they will succeed as well as Barraquer.

The figures of his results of his first thousand cases are infinitely finer than any of us could ever hope to attain.

Finally, the following table of statistics will be of interest to those who hold that intracapsular extraction is on its trial, and that if it does succeed the expression method will

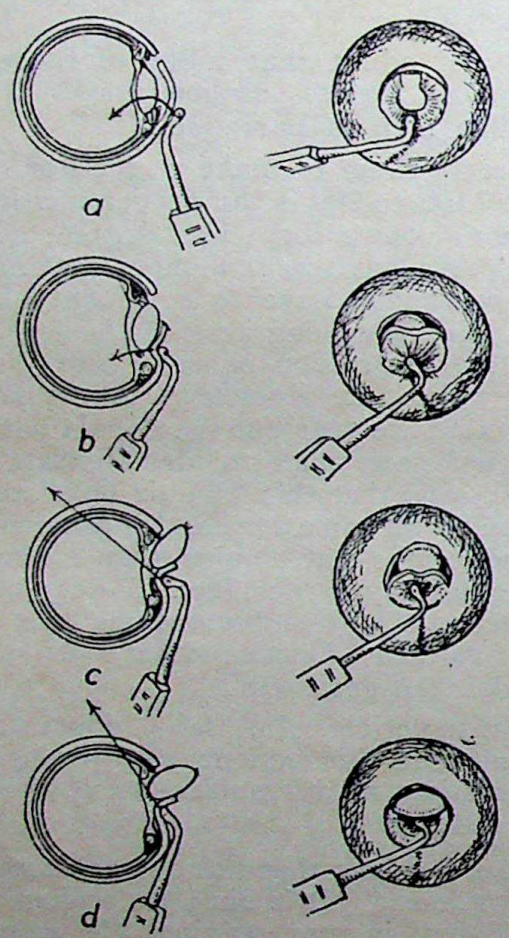

FIG. 3.— THE UPRIGHT DELIVERY OF AN EASILY DISLOCATED HARD CATARACT.

Figure (*a*) represents the lens hook laid on the flat over the lower part of the cornea, the point above. The arrow shows the direction in which the point is moved by rolling the handle of the instrument between the thumb and fingers. The lens dislocates at once and subsequent figures show the direction of pressure changed to follow it up as it emerges. The vitreous suffers no deformity.

The section views are copied from drawings sent by Colonel Smith and the front views are original sketches by Dr. D. T. Vail, Sr., of Cincinnati.

have to make way for some of the forceps methods. In these figures the Punjab accounts for close on 19,000 intracapsular extractions in the year, while the figures of the trans-Indus mission hospitals which are not included in the Punjab statistics amount to well over 2,000 per annum. The other provinces generally go in for capsulotomy. In North Western India if a surgeon cuts for stone in the bladder his practice will be severely limited—the patients demand crushing and will go elsewhere. The situation there is similar to that with cataract—the intracapsular operation (expression from without) is demanded and the hospitals where capsulotomy is practised are empty.

Year.	Punjab and N. W. F. Province.	United Provinces of Agra and Oudh.	Bengal including Calcutta.	Madras Presidency and City.	Bombay Presidency and City.
1881	265	2,640	357	..	..
1882	507	3,321	350	480	..
1883	435	4,641	391	255	193
1884	596	6,048	500	222	230
1885	948	6,048	763	443	197
1886	1,501	5,506	551	407	219
1887	2,459	5,625	635	511	322
1888	2,658	5,966	893	730	266
1889	3,857	6,739	1,235	749	265
1890	4,013	7,615	2,017	1,227	216
1891	4,482	9,445	1,683	1,103	290
1892	4,294	8,880	1,597	1,307	355
1893	5,309	9,124	1,481	1,271	362
1894	5,305	9,222	1,407	1,233	407
1895	6,216	10,563	1,913	1,234	487
1896	5,323	8,923	2,845	1,425	590
1897	4,667	6,514	3,134	1,562	382
1898	4,534	5,613	2,560	1,222	523
1899	5,319	5,734	3,051	1,301	578
1900	5,014	5,971	2,862	1,472	697
1901	6,590	5,787	3,159	1,621	709
1902	6,909	5,335	3,885	1,495	879
1903	6,107	5,157	3,537	1,418	942
1904	7,465	5,023	3,514	1,346	1,012
1905	7,929	4,994	3,053	1,149	917
1906	8,317	6,421	3,653	1,232	1,010
1907	8,122	5,568	3,866	1,404	962
1908	8,099	5,474	4,322	1,034	985
1909	11,156	5,442	4,145	1,442	1,238
1910	11,397	6,165	4,266	1,187	1,419
1911	12,290	6,829	4,953	1,344	1,424
1912	15,576	8,846	2,464	1,526	1,467
1913	16,236	9,905	1,291	1,655	1,586

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Year.	Punjab and N. W. F. Province.	United Provinces of Agra and Oudh.	Bengal including Calcutta.	Madras Presidency and City.	Bombay Presidency and City.
1914	14,907	8,712	1,391	1,751	1,567
1915	16,457	8,322	1,357	1,833	1,673
1916	15,542	8,059	1,283	2,132	2,086
1917	14,794	7,512	2,772	2,374	1,695
1918	13,112	7,897	2,554	2,067	1,402
1919	19,093	6,828	2,329	2,866	1,622
1920	19,721	5,716	2,308	2,994	2,227
1921	15,093	4,165	2,170	3,351	2,262
1922	17,488	5,208	Missing	3,190	1,942
1923	17,617	6,019	2,599	3,527	1,994
1924	18,825	5,754	3,124	4,136	1,224

Population census—1911:—

Punjab and N. W. F. Province ..	22,171,889
United Provinces of Agra and Oudh	47,182,044
Bengal including Calcutta ..	79,973,084
Madras Presidency and City ..	41,405,404
Bombay Presidency and City ..	16,672,642

The above figures (extracted from the official records of the India Office) do not include the Punjab Frontier since 1913, nor do they include mission hospital work, e.g., the Bombay figures do not include the work done by Dr. Holland at Shikarpur though in the Bombay Province, nor do they include the Central Province and the Foreign Department, which is more than one-third of India.

When I commenced work in the Punjab in 1895 the lens coucher was doing most of the work; the capsulotomy operation could hardly hold its own against him. Every day we saw the result of his work. Now he has been put under by the intracapsular operation and you seldom see a case of his work; not so in the other provinces where the capsulotomy operation is practised.

The argument is often advanced that cataract is very much more prevalent in the Punjab than in the rest of India, but this is not the case—it is equally prevalent all over India, and when the surgeons in other parts of India become as accomplished at the intracapsular operation as they are in the Punjab their figures will mount up in proportion to their populations as they have done in North Western India.

In the face of these figures it is amusing to hear Britons, Americans and Germans talk as if their voice would decide what is the best operation, considering the smallness of their experience. The verdict of the Indian peasant is destined to decide the treatment of cataract as it has decided that of stone in the bladder. It is often said that the Punjabi is easily satisfied, but this is not the case. The Punjab peasantry are about as highly utilitarian and as exacting as any peasantry in the world. When the patient returns from hospital the results of his operation are discussed and criticised round the village hookah with the itinerant priest, who passes the word from village hookah to village hookah. It is there

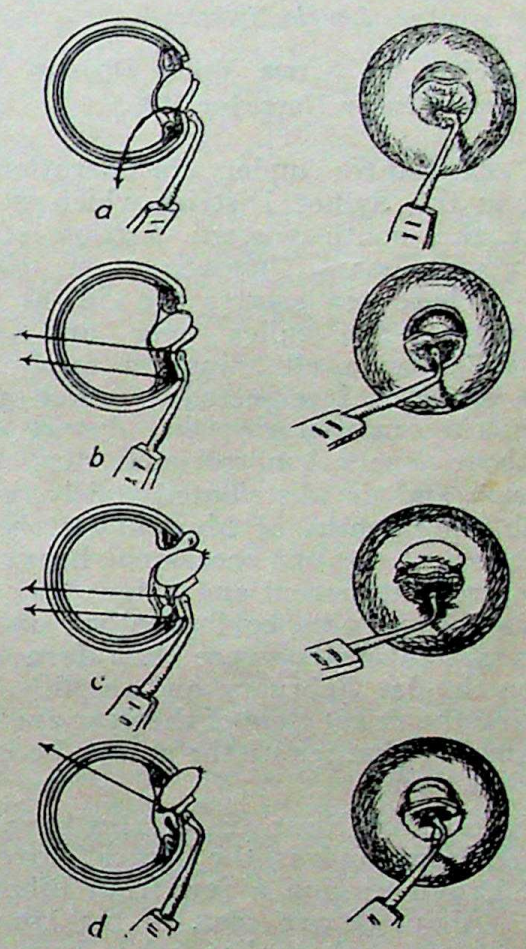

FIG. 4.—THE UPRIGHT DELIVERY OF THE MORE FIRMLY ANCHORED HARD CATARACT.

The lens refuses to dislocate on the first backward twist of the point of the lens hook.

So pressure has to be made with the heel as well as the point of the lens hook to drive the lens forward by the hydrostatic pressure of the vitreous. The suspensory ligament is shown on the point of parting from the lens in Fig. (*b*) while in Fig. (*c*) the result which follows in heavy hands is shown. The pressure with the heel of the hook toward the optic nerve has not been relaxed the moment the ligament has given way, and vitreous is pressed out along with the lens and above it; while in Fig. (*d*) the heel has been lifted out the right moment; the pressure relaxed and altered in direction.

that the reputation of hospitals is made or marred and the fate of rival operations is decided. The result of the verdict is shewn in the fourfold increase of the statistics for the Punjab during the last thirty years, solely on the basis of intracapsular extraction, while in the other provinces where capsulotomy is

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practised the figures have remained almost stationary.

These "big battalions" constitute an argument which cannot be ignored.

MASS TREATMENT FOR HOOKWORM INFECTION ON TEA ESTATES IN ASSAM.

By DR. E. MILFORD RICE, M.D.,

Langla, Sylhet.

(Read before the Surma Valley Division, British Medical Association in November 1926.)

THE tea estates under consideration are located in the Sylhet District which is situated in the south-western portion of the Province of Assam, bordering on Eastern Bengal. These tea estates are in an area about twenty-five miles long and about fifteen miles wide, all being on fairly high ground which is intersected by rice paddy fields. The rainfall in the district averages about one hundred and ten inches *per annum* and is distributed fairly evenly through the months of May to October inclusive, except for an occasional heavy rain just before this period and a few very light showers during the cold weather months. The mass treatments were therefore given between the 1st February and the 6th April, this being the driest time of the year and there being smaller chances of the coolies becoming re-infected then.

The coolies on these tea estates have been recruited from Madras, the Central Provinces, United Provinces and a few from Bihar and Orissa. About 80 per cent. of the labourers employed are old coolies who have been employed on the estates for years, the remainder being coolies who have been recruited year by year and who usually arrive from their various countries infected with hookworm. This being the case, new coolies are a constant source of infection and they should all be treated immediately upon their arrival upon an estate. No labour is locally recruited but villagers do, on occasions, come into the various estates to work by the day, but they do not live in the lines and are therefore not to be considered from the standpoint of infecting labour in estate lines. Coolie houses are usually built in streets where the available land will allow, but in many instances they are very badly scattered due to the hilly formation of the land in the Sylhet District. In some instances the lines are surrounded by jungle, but usually there is tea or rice paddy land on one or more sides. Few tea estates have any definite latrines except those which are required by the Factory Act, and coolies generally pick out defæcation areas in the neighbourhood of their houses, the majority seeking nearby jungle, tea or other screening, while others are not so particular and defæcate in the open in the immediate area around their houses or in open rice paddy land. The general habit is to stick to the one localized area and these defæcation areas become constant sources of direct re-infection as well as feeding places for pigs, dogs and cattle, who, in turn, deposit their hookworm-laden fæces in the lines where infection of the coolies may again take place. Ramsey (*Indian Med. Gaz.*, Sept., 1923) says: "The reason the pig is so dangerous in spreading hookworm is that having gorged himself with human fæces from the jungle around the lines, he returns with his fæcal-laden bowel to disseminate his helminthic and protozoal infections around the coolie huts." This certainly applies to dogs as well and may even apply to cattle. Coolie houses are usually built of bamboo with thatch roofs, the bamboo walls being plastered with clay mixed with fresh cattle manure. The women do this work and this may account for the relatively

TABLE I.

Tea Estate.	Date of Treatment.	Number of Patients Treated.			
		Men.	Women.	Children.	Total.
Karimpore ..	Feb. 1925	206	220	141	567
Indeswar ..	Mar. 1925	64	54	30	148
Burrumsal ..	Feb. 1925	102	119	99	320
Etah	Mar. 1925	209	219	95	523
Udna	Mar. 1925	178	195	112	485
Lungla	Feb. 1925	372	484	196	1,052
Terapassa 1st ..	Apr. 1925	138	122	77	337
Terapassa 2nd ..	Feb. 1926	118	113	65	296
Kannyhatti ..	Feb. 1926	235	346	78	659
Daocherra ..	Feb. 1926	87	133	48	268
Shamshernagger ..	Feb. 1925	378	555	241	1,174
Bhagicherra ..	Feb 1925	98	120	50	268
Sooncherra ..	Feb 1926	217	210	110	537
Rajnager ..	Feb. 1925	265	386	320	971
Hingajea ..	Mar. 1925	394	477	173	1,044
Holicherra ..	Apr. 1925	110	144	40	264
Degaicherra ..	Apr. 1925	83	72	28	183
Luayoni ..	Apr. 1925	90	131	36	257
Kaliti	Mar. 1925	106	1 8	96	386
T TALS ..		3,420	4,264	2,005	9,739

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higher e.p.g. (eggs per gramme) counts in the female if it can be definitely proved that the eggs of the hookworm pass through cattle without harm.

The mass treatment of coolies was started in February 1925, when 8,516 coolies were treated between that time and April 6th of that year. A further 1,223 were treated in February 1926, making a total of 9,739. (*See* Table I.)

No coolie who had jaundice or any enlargement of the liver was treated, but no other precautions were taken, other than to have the chowkidars (line watchmen) instruct all coolies that they were not to drink spirits for 24 hours before or after they had received treatment. They were also told that they were to have their usual morning meal before coming to the general muster for treatment. This series of 9,739 coolies were treated with carbon tetrachloride in magnesium sulphate solution. Each adult coolie between the ages of 18 and 50 was given 60 minims of carbon tetrachloride, while children under 18 years were given three minims for every year of their age, adults over 50 being given doses ranging from 25 to 50 minims. Adults of 18 to 50 years of age were given one ounce of saturated solution magnesium sulphate, the others being given amounts in proportion to the dose of carbon tetrachloride they were to receive.

As many as seven hundred coolies were treated in one day by having them line up according to the pay lists and passing by the treatment table as their names were called. As their names were called they passed by the first examiner (usually the tea estate doctor babu), who examined them for jaundice, any enlargement of the liver, and to see that they were not under the influence of spirits. If any of these were found the coolie was passed out of the line and not treated, a record of his or her name being kept for future treatment. Any coolie who objected was not treated against his will but after the first few days there was no trouble in treating them all and those who had refused treatment the first day usually came up later on for their treatment. All pregnant women were given the same treatment as the other women. After having passed the first examiner they proceeded to the table where the doses were mixed by the second examiner (usually the writer). Here the magnesium sulphate solution was measured into small medicine glasses, the carbon tetrachloride being measured in a glass syringe calibrated in minims. By forcing the plunger of the syringe down quickly the carbon tetrachloride is shot with some considerable force into the magnesium sulphate solution which holds it in suspension sufficiently long for the coolie to drink it with the minimum amount of danger of the fumes being inhaled. Immediately the dose is taken, the coolie is asked to open his mouth so that the examiner can see that he has not retained the dose without swallowing it. This latter procedure is important, as should the coolie hold the mixture in his mouth and breathe over it there is a danger of the vapour coming in contact with the mucous membranes of the respiratory tract which might produce a reflex stoppage of the respiratory functions as has been reported. For the same reason, carbon tetrachloride should never be given to a child who is struggling.

In this series of 9,739 cases treated with carbon tetrachloride and magnesium sulphate solution there were no fatalities as the result of, or immediately following, the treatment. About 3 per cent. of the cases complained of slight abdominal pain, vertigo, nausea and in a few cases vomiting some hours after the treatment, but the symptoms were all transitory. About 1 per cent. said they had passed round-worms but no definite records of this were kept.

Of the coolies treated in 1925, 337 were coolies of the Terapassa Tea Estate and 296 of these same coolies were again treated with carbon tetrachloride in 1926, while a further 46 were treated with carbon tetrachloride in conjunction with oil of chenopodium. As the entire population of this tea estate is only 422, nearly every coolie, except for very young children and old dependents, was treated for the second time in twelve months.

At the general muster on the Lungla Tea Estate in 1925, 1,052 coolies were treated with carbon tetrachloride and a further 451 were treated with carbon tetrachloride and oil of chenopodium during the rest of the year, these latter being coolies who were not present at the muster and some few very anæmic coolies. This makes a total of 1,503 cases treated in a population of 1,675. Some few of these cases may have been treated twice, but the number is negligible. The 451 cases treated with carbon tetrachloride and oil of chenopodium are not included in Table I, but it may be of interest to know that about 50 per cent. of these latter cases passed round-worms as well as hookworms.

In May 1926, Dr. Asa C. Chandler, of the Calcutta School of Tropical Medicine, who was making a hookworm survey of India, visited this district, and while here took the opportunity of determining the effect of the mass treatments which had been carried out on the Lungla and Terapassa Tea Estates. Dr. Chandler (*Ind. Jour. Med. Res.*, Oct. 1926), published tables showing his findings and has very kindly given me permission to use portions of these tables which I am modifying to show what treatments have been given, populations, etc., but in no way have I altered

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TABLE II.

Garden or village.		Date of treatment.	Treatment given (type).	Number treated.	Total population.	Number of specimens examined.	Under 100 e.p.g.		100—500 e.p.g.		600—2,000 e.p.g.		2,100—5.000 e.p.g.		5,100—10.000 e.p.g.		Over 10,000 e.p.g.		Total per cent. infected.	Average e.p.g.	Estimated average worms per person.	*Ascaris.*
							Per cent.	Average e.p.g.	Per cent.	Average e.p.g.	Per cent.	Average e.p.g.	Per cent.	Average e.p.g.	Per cent.	Average e.p.g.	Per cent.	Average e.p.g.				
Basudeopur village		..	..	..	About 200	48	29·1	40	39·6	58	18·7	1,238	4·2	9,350	6·1	6,600	..	..	100	855	68	854
Manu village		..	..	..	About 400	41	4·9	40	51·2	214	29·3	908	7·3	2,900	4·9	5,050	..	..	98	880	70	75
Lungla Tea Estate.	Mass treatment	February 1925.	$C.Cl_4$.	1,052	1,675	49	51·	40	24·5	167	10·2	1,080	..	0	..	0	..	0	85·7	171	14	85
	Hospital treatment	During 1925.	$C.Cl_4$ and Ol. Chen.	451																		
Terapa Tea Estate.	Mass treatment	April 1925.	C.	337	422	57	36·7	40	27·9	170	..	0	..	0	..	0*	..	0	66	62	5	46
	Hospital treatment	During 1926.	$C.Cl_4$ and Ol. Chen.	46																		

* Omitting one case with 6,300 e.p.g. in which treatment received by all the others was avoided.

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his figures. (*See Table* II.) Those figures in heavy type are Chandler's, those in light type are my own.

It will be seen from a perusal of Table II, that the coolies of the Terapasaa Tea Estate have had two mass treatments, the first in 1925 and the second in 1926; those of the Lungla Tea Estate, one mass treatment in 1925 only. In this Table are shown figures for the two *bastis* (villages) which are adjacent to the two tea estates, the *ryots* of which have received no treatment, and which shows the approximate relationship between treated and untreated groups. In studying the figures for the total per cent. infected, average e.p.g., and the estimated average worms per person, those for the Manu and Basudeopur *bastis* are so nearly alike that it is unnecessary to consider them separately. In all probability, taking into consideration the topography, type of lines, and the proximity of the *bastis* to the tea estates, had this survey been carried out prior to the time mass treatments were given, the tea estate figures would have been much the same as those for the *bastis*.

After averaging the figures for the *bastis*, the Lungla Tea Estate coolies, after one mass treatment, show a reduction of 13.3 per cent. in the total per cent. infected, while the Terapassa Tea Estate coolies show a reduction of 32.5 per cent. after two mass treatments. The average e.p.g. counts show even more striking results, the Lungla coolies only averaging 1|5th as many e.p.g. as the *basti ryots* (171 : 867) while the Terapassa coolies only have 1|14th as many (62 : 867). This shows a considerable reduction in coolies infected and also shows that those coolies who are infected still have very much lighter infections than have the *basti ryots*; no coolie of the Lungla group having more than 2,000 e.p.g. and none of the Terapassa group more than 500 e.p.g. (This is excluding the one case at Terapassa who had 6,300 e.p.g. which Dr. Chandler has not entered in his figures as the woman had deliberately put her fingers down her throat and vomited on the two occasions on which she had been treated.) Since this case has been brought to light all coolies have been cautioned against this practice as there is a real danger of the carbon tetrachloride being inhaled when vomited immediately after it has been taken.

CONCLUSIONS.

(1) Mass treatments for hookworm disease should be given in February and March on tea estates in Assam.

(2) Most newly recruited coolies have hookworm infection when they arrive on tea estates from their respective countries and should be treated upon arrival.

(3) If cattle manure contains active hookworm eggs, heavy infections might be expected through coolies using it as plaster for walls and floors of their houses.

(4) Pigs and dogs certainly, and possibly cattle, by passing their stools in coolie lines after eating human fæces, are a means of reinfection.

(5) Carbon tetrachloride, given in 60-minim doses to adults (18 to 50 years of age) in one ounce of saturated magnesium sulphate solution and after a morning meal, is a safe drug to use in tea estate practice. It is also safe to use for children and the aged if given in proportionate doses.

(6) No precautions are necessary other than to warn patients that they are not to take alcohol or spirits for 24 hours before or after treatment and to treat no case with any liver complaint.

(7) Pregnant women can be given the same dose as other coolies.

(8) The number of infections can be materially reduced by such mass treatments.

(9) Heavy infections can be reduced to harmless ones by such mass treatments.

AN ANALYSIS OF 108 INTRAVENOUS IODINE INJECTIONS.

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DURING the year 1925-26, partly from the dearth of drugs and partly with a view to test its results, 108 intravenous iodine injections were given for the following conditions in this dispensary.

1. *Respiratory diseases* (except tubercle of the lung)—13.

(*a*) For sero-fibrinous pleurisy, recurrent—9.

(*b*) For intractable bronchitis, generally resistant to expectorants—4.

The results were satisfactory. The injections for pleurisy represent two cases. In one case which used to recur almost every month 8 intravenous injections were given, first a series of six, one every day and later one every alternate day. The patient has not had his usual recurrence for some months now. In the second case the patient was getting salycylates, iodides, etc., with no marked improvement. After a single injection the pleural friction disappeared and the mixture appeared to work better. The four injections for bronchitis represent two cases which were running a very prolonged course, now clearing up in one area and attacking another. In both the cases two injections, one each on

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alternate days, brought down the temperature and cleared the lungs wonderfully. Mixture by mouth was also being continued at the same time.

(2) *Diseases of organs of locomotion*—19.

These were cases of rheumatoid arthritis, chronic synovitis and gonorrhœal rheumatism. These represent six cases. A cure was found with six injections in one case and the rest were greatly relieved, but these latter did not have an appreciable number of injections, each of them having 2 to 3 and discontinuing for several reasons, mostly being satisfied with the relief and unable to spare time.

(3) *Lymphangitis*—10.

Two cases of lymphangitis were treated and they were both cured. These were both chronic and of some years' duration. One had six and the other 4 injections.

(4) *Cellulitis, chronic ulcers, phagedena, and necrosis of bone*—12.

The inflammation in cases of cellulitis used to improve after one or two injections. When there was obvious suppuration, multiple incisions and continuous antiseptic baths were also used. In cases of chronic ulcers lasting for months with indurated edges and where scraping was refused, 2 or 3 iodine injections stimulated them to heal fast. In cases of phagedena the improvement was remarkable, even with the first injection. In cases of necrosis of bones the sequestrum used to separate with great rapidity and the discharge from the sinus became less foul every day; the wound used to close ultimately.

(5) *Furunculosis*—7.

During the height of summer some people are in the habit of suffering from crop after crop of boils on the face, hands and anywhere on the body. All external measures such as zinc, boric, ichthyol, antiphlogistine, etc., give only temporary relief. I have seen a course of Kalazana tablets with one or two iodine injections improve the condition marvellously.

(6) *Scabies*—22.

Persons suffering from scabies in these parts are a common sight at this dispensary. Cases were selected for iodine treatment. Such as had it all over the body or those suffering for several months were chosen. About three to four injections with nothing but general cleanliness locally twice a day improved them all.

(7) *Enlarged lymphatic glands, scrofular and otherwise*—7.

It is unfortunate that none of the cases underwent a thorough course. They were all improved after two or three injections each.

(8) The other 18 injections were—2 for chronic otorrhœa,—cured: 2 for pyæmia—the case stopped developing further abscesses and the abscesses then existing began to heal; 2 for general deblity, where the patient felt much better; 12 for cases of tuberculosis of the lung, where sodium morrhate had stopped showing further improvement, or alternately with sodium morrhate. Two cases were thus tried and showed marked improvement.

In all the above cases the prescription given in the *Indian Medical Gazette* (iodine 1 dr., potassium iodide 1 dr., aqua distillata 5 oz. 2 dr.) was followed. If 1 dr. is taken to be equivalent to 27½ grains according to Avoirduposis weight, 20 minims of such a solution contains about one-fifth of grain of iodine, and with the dose suggested (3 to 6 minims) the iodine content is far too little. I therefore employed the above prescription with 10 minims as my initial dose, and increased it by 5 minims at every other injection until I reached 40 minims, which is approximately equal to half a grain of iodine. Intravenous iodine treatment in comparison with other methods is very cheap, saves a lot of trouble, and from the leucocytosis it produces may be claimed as a panacea. A time may come when many of the drugs in the *Pharmacopœia* may disappear and be displaced by iodine.

NOTES ON INFANTILE CIRRHOSIS OF THE LIVER.

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THE real and specific cause of this disease is not yet known. Whether it is due to the custom of artificial feeding in wealthy people with all kinds of patent foods irrespective of the indications and medical advice for the infant, or due to the remote or congenital effects of venereal diseases such as syphilis, etc., in the parents, or to feeding the infants concerned with pure cow's milk in unsuitable and large quantities, or to too early feeding of infants with starchy and fatty foods, or whether it is a food deficiency disease, has yet to be proved. Whatever may be the cause or causes of the disease, it is a fact that this disease is prevalent in those parts of South India where the use of patent and tinned foods is the rule in every well-to-do household, also in families where there is no regular system of giving foods suitable to a particular baby at a certain age. It is well known to all the Hindus that one of the religious observances during the period of one's life from birth to death is the food-giving ceremony, i.e., the *annaprasanam*. This ceremony is performed when the child attains a year of its existence

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or thereabouts. This is a ceremony in which the child gets its "rice food" for the first time. It may be that this system has been made in accordance with the hygienic principles, like many other so-called mystic systems for which by the light of modern knowledge we can give a scientific explanation. People in the old days might have found out that giving rice or such other starchy food to infants when they are younger than a fixed age would be detrimental to their health. Nowadays as there is a wholesale condemnation of the so-called mystic ideas without duly considering their possible scientific basis, it is no wonder that many a disease, quite unknown during ancient days, has sprung up among us now. That infantile cirrhosis of the liver, though the exact ætiology of it is unknown, whether due to child's food either in excess or deficiency, contributes one of the important causes of infantile mortality in India is an almost settled fact. As mentioned above, the ceremony of giving rice for the first time practised in the Hindu families of Malabar, though this function ought to be conducted in every orthodox Hindu family, is not generally nowadays performed in the Tamil districts of South India. Infantile cirrhosis was almost unknown in Malabar, including the two Native States. So much so that the grandmothers of these parts do not even now know that there is such a disease at all. But on the other hand, the first thought that strikes a young pregnant woman in the Tamil district to-day is how to save her future infant from the disease. Evidently it goes without saying that infantile cirrhosis of the liver is very common among the infant population of these Eastern Districts. Is it possible that the early administration of starch and of fatty foods acts as a primary cause of its incidence? Whatever it is, one can say with confidence that rearing of infants in Tamil districts with a certain definite routine with regard to food, etc., is not what it ought to be. Not only is there great irregularity in their food as regards quantity and quality, but also the parents pay very little attention to personal hygiene. For example daily baths are not given regulary in these Eastern Districts which are very hot in summer.

Religious ceremonies and observances are numerous in the Hindu household, when all kinds of sweet dishes are prepared. The infant gets easy access to the eatables; one determined cry secures for him a couple of sweetmeat cakes. Sweet and starchy preparations will invariably be served up during a ceremony and not a month passes without a ceremony or two, not to mention the daily preparation of similar foodstuffs for others in the family.

The next point for consideration is the administration of patent foods, irrespective of their quality and of the advice of medical men. It is customary nowadays among the Brahmin population of the district in which community the disease is most common, among the rich as well as the poor, to have ready bottles or tins of patent foods as soon as a woman's accouchment period approaches. Whether the use of such foods is the cause of the disease or not, it can be definitely proved that many alimentary disorders which always precede infantile cirrhosis are caused by the injudicious administration of such foods. Even from the second or the third day of an infant's life cow's milk with sugar is administered on the plea that the mother has not sufficient milk to feed her baby. We all know that cow's milk administered plain as it is will not be digested even by an older child. How much less is the power of the digestive mechanism of a poor baby a few days old? How could one legitimately think that such injudicious administration is not unintentional homicide? Is it not over-taxing the liver of the new born baby and paving the way for infantile cirrhosis?

A further point is the prevalence of syphilis among the parents. Though syphilitic cirrhosis of the liver stands by itself as a separate disease, there is not sufficient evidence to say whether paternal syphilis acts as a cause of the occurrence of infantile cirrhosis. Though not all, many of the cases of infantile cirrhosis of the liver which come to one's notice have a syphilitic taint in the parents. Also there are some cases of infantile cirrhosis which may be really syphilitic cirrhosis.

Alcoholism among the parents, though not uncommon, cannot be included among the ætiological factors. If alcoholism in the parents is one of the causes of infantile cirrhosis then the children of the poorer and lower classes ought to be affected in large numbers, instead of its high prevalent incidence among Brahmins and other high caste Hindus and Muhammadans where the drink evil is at a minimum.

Suspicious causes such as malaria, kala-azar, rickets, scurvy, etc., can very well be excluded as ætiological agents, as such ailments have a definite and clear cut clinical history with them.

The disease is found mostly among Brahmins and other high class Hindus and Muhammadans. But it is rare among the Brahmin population of Malabar: and still less in other castes. The daily bath given to the baby with withholding of carbohydrates, etc., until the infant is able to digest them, the rainy climates of Malabar, the lower incidence of venereal diseases among the parents, the invariable breast feeding of infants in whatever sphere of life, may afford protection to the infants of Malabar from this dreadful disease.

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OBSERVATIONS ON THE PHARMACOLOGICAL ACTION OF CONESSINE, THE ALKALOID OF *HOLARRHENA ANTI-DYSENTERICA*.

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Holarrhena antidysenterica is a small deciduous tree with white flowers, belonging to the natural order *Apocynaceæ*, from which are derived most plants of the digitalis group. This is a point of interest because the active principles of *H. antidysenterica* also have a selective action on the muscle of the heart. This plant has many Sanskrit names, the best known being *kutaja* and *kalinga*. The other vernacular names are:—*kurchee* (Bengali), *kureya, dudhi* (Hindi) and *kulappalai* (Tamil). The seeds are called *indrayava* or "Indra's seeds" in Sanskrit and *indrajab* in Hindi. In Persian it is known as *indrajavatalkh* and it is well known in Arabian medicine.

The plant is fabled to have sprung from the drops of "Amrita" or water of life which fell on the ground from the bodies of Rama's monkeys, which were restored to life by the god Indra. It is a native of the tropical Himalayas, going up to an altitude of 3,500 feet; it is also found throughout the dry forests of India, even as far south as Travancore. This plant is often confused with another one of the same family called *Wrightia tinctoria*, which is medically inert. Linnæus was originally responsible for this confusion, but it was rectified by Brown (1809), who revised the whole of the *Apocynaceæ* family. Although differentiation between *Holarrhena antidysenterica* and *Wrightia tinctoria* has thus been made for a hundred years, yet they are often mistaken for one another and this fact probably accounts for the drug having fallen into disrepute. *Wrightia*, however, has white jasmine-like flowers with a fragrant odour, while the flowers of *Holarrhena* are odourless. Furthe., the *Wrightia* bark can be easily identified because of its reddish brown colour and its smooth appearance as compared with the *Holarrhena* bark, which is thicker and is of a dirty white or buff colour and has a markedly bitter taste. The seeds of *Holarrhena* resemble oats; they are very bitter and are contained in long follicles about the thickness of a quill. They have a tuft of hairs on the end most remote from the foot-stalk, whilst in the *Wrightia* seeds the tuft is on the end next to the foot-stalk.

A kind of indigo dye is extracted from the leaves, and they are used as fodder in certain parts of the Punjab. The wood is white, soft, and even-grained and is used for carvings and for making furniture. The bark of both the stem and the root and the seeds are amongst the most important of the medicines of the Hindu Materia Medica. The bark is considered to be a powerful antidysenteric, while the seeds are said to have astringent, febrifuge, antidysenteric and anthelmintic properties. In Arabian medicine the seeds are considered carminative and astringent, valuable in pulmonary affections, tonic, lithontriptic and aphrodisiac. Combined with honey and saffron they are made into pessaries which are supposed to favour conception. The pharmacopœia of India classed *H. antidysenterica* amongst the non-official remedies but reported very favourably on its therapeutic qualities. The Hindu physicians use it in form of a fluid extract or expressed juice of the fresh plant, a compound decoction and a confection prepared from the bark and the seeds are often given in dysentery with beneficial results. Kanny Lall Dey was so struck with its therapeutic efficacy that he advocated that it should be made official in the *British Pharmacopœia*.

H. antidysenterica has been introduced into Western medicine and has lately been tried somewhat extensively in the treatment of amœbic dysentery. The remedy was at first used in the form of an infusion of the root bark; this however, is very bitter and most unpalatable. Burroughs, Wellcome & Co., have put "Tabloids" made from the bark on the market and in this form it is easily taken and has been combined with emetine treatment with beneficial results. Major R. Knowles, I. M. S., reports to us that he has found the simultaneous administration of emetine hypodermically and "Tabloid" extract *kurchi corticis* orally of marked value in the treatment of amœbic dysentery.

Chemistry of the Bark.

The active principles of the bark of *H. antidysenterica* are the alkaloids conessine and holarrhenine. An artificial oxidation product, oxy-conessine, has also been prepared. Conessine was first isolated by Haines (1858), and Stenhouse (1864) independently prepared it from the seeds. In 1880, R. C. Datta in collaboration with R. D. Ghosh isolated the alkaloid under the name of "kurchicine" and this was administered in chronic dysentery in

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doses of 2 to 5 grs. Pyman (1919) described the chemical properties of the two alkaloids.

H. antidysenterica and the allied species *H. africana,* and *H. congolensis* were the subjects of various papers at different times. We do not think it necessary therefore to go into the details of the process of extraction of the alkaloids contained in it. We here summarise briefly the process we have followed for the isolation of conessine for our work.

An assay of the powdered bark shows that it contains 1.5 per cent. of total alkaloids by weight, but it is difficult to get conessine in pure condition out of the crude total alkaloids, much being lost in the process of purification. The following methods were employed for the isolation of the alkaloid:

(*a*). The powdered bark was exhausted with 2.0 per cent. HCl by cold percolation. The acid solution was then nearly neutralized (faintly alkaline) with NaOH, and the precipitate which formed was filtered off. The filtrate was then treated with excess of strong NH_4OH and the liberated base taken up with chloroform. On distilling off the chloroform, a brown oily mass of crude alkaloid was obtained. This was dissolved in the smallest quantity of absolute alcohol, and a saturated solution of oxalic acid in alcohol was added till the solution was distinctly acid. The oxalate which formed was then filtered, washed with absolute alcohol, dissolved in water, treated with excess of strong NH_4OH and the base taken up with ether. The ethereal solution on concentration deposits a nearly white amorphous powder which has a melting point of 105 to 108°C. By repeating the above process, viz., re-forming the oxalate and again re-liberating the base the alkaloid having a melting point of 121.5°C. was obtained.

(*b*). The above method being very laborious and tedious, the following method was tried and found to give good results. The finely powdered bark was mixed with 20 per cent. of its weight of lime (made up into a thin paste with water), dried in the air and exhausted with 90 per cent. alcohol. The main portion of the alcohol was distilled off and the remainder removed *in vacuo*. The residue was then extracted with dilute HCl several times till free from the alkaloid. The acid solution was then nearly neutralized with NaOH till a faint turbidity appeared. This removed a good deal of the colouring matter and other impurities though not without a slight loss of alkaloid. The solution with the precipitate was shaken up with ether, the ether separated, the aqueous solution filtered and the base precipitated with excess of strong ammonia. The liberated alkaloid was then taken up with ether, which on distillation gave a pale cream coloured semi-solid mass. This was dissolved in absolute alcohol and treated with a saturated alcoholic solution of tartaric acid. The tartrate formed was filtered, washed with absolute alcohol, dissolved in water, the alkaloid regenerated with strong ammonia and taken up with ether. After removal of the ether and keeping the residue exposed in the air for a few days we get the pure alkaloid with a melting point of 120-121°C.

Pharmacological Action of Conessine.

Keidal (1878) first attempted to work out the physiological action of conessine. His conclusions were that the alkaloid depressed the centres for conscious sensation in the brain and had also a depressing effect on the respiratory and vaso-motor centres in the medulla. It decreased the reflexes generally and it increased the peristaltic movement of the intestines. He concluded that conessine behaved in a general way like morphine and chloral hydrate.

Burn (1914) investigated the pharmacological action of conessine, oxy-conessine and holarrhenine. He found that conessine exerts a considerable narcotic action on frogs but has no appreciable effect in mammals. It has an anæsthetic effect on the cornea of the rabbit, though it does not produce any loss of sensation in the peripheral nerves when given subcutaneously. Conessine and holarrhenine according to him are both cardiac poisons, causing the isolated perfused heart to come to a standstill. They have a particularly destructive action on the tissues of the auriculo-ventricular bundle and when injected intravenously produce heart block. In small doses both the alkaloids when given intravenously produce a rise in the blood pressure, which is still seen after the vaso-constrictor nerve endings are paralysed with ergotoxine.

Brown (1922) tried the action of conessine on free living amœbæ and found that not only had the drug a marked amœbicidal action, but even in a dilution of 1 in 1,000,000 it was capable of inhibiting their growth in culture media. The action of conessine in this respect was equal to that of emetine. Neither of these alkaloids had any marked effect on the organisms of bacillary dysentery.

H. antidysenterica bark is now being largely used in treatment of dysentery and we carried out a series of experiments with a view to confirming the previous work and extending it in other directions. Our investigations were confined mainly to conessine, which is the chief alkaloid present in the bark of *H. antidysenterica* growing in India; holarrhenine only occurs in very small quantities. In most of our experiments we used conessine hydrochloride, but we also used the hydrobromide and the tartrate which were quite stable salts.

Action on Protozoa.

(*a*). Conessine salts have a marked action on the undifferentiated protoplasm, and free living and other protozoa are rapidly killed. Following the method of Henry and Brown (1923), we performed experiments to determine the comparative toxic effects of conessine hydrochloride and emetine hydrochloride on *Paramœcium caudatum* and other protozoa in the presence of alkali and without it.

For convenience in making comparable solutions, the alkaloidal solutions were made by dissolving a molecular weight (M) in grammes of the base in one litre of water and then diluting to the required strength. M|1,000 therefore means a molecular weight

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in grams of the alkaloidal base in 1,000 litres and so on for other expressions M|100,000, etc.

The results are set out in the following tables:—

Results with P. caudatum.

		In presence of N|200 NaOH.	In absence of alkali.
	(a) *Conessine.*		
M|10	Conessine + culture (1 in 28)	Death instantaneous.	All dead after 1 or 2 secs.
M|100	Conessine + ,, (1 in 280)	All dead after 4 secs.	All dead after 10 secs.
M|1,000	Conessine + ,, (1 in 2,800)	All dead after 10 secs.	All dead after 19 secs.
M|10,000	Conessine + ,, (1 in 28,000)	All dead after 2 mins.	Alive even after 76 hrs.
M|100,000	Conessine + ,, (1 in 280,000)	Alive even after 20 hrs.	..
	(b) *Emetine.*		
M|10	Emetine + culture (1 in 20)	All dead almost instantaneously.	All dead in 3 secs.
M|100	Emetine + ,, (1 in 200)	Dead after 5 secs.	Dead after 15 secs.
M|1,000	Emetine + ,, (1 in 2,000)	Dead after 15 secs.	Dead after 15 mins.
M|10,000	Emetine + ,, (1 in 20,000)	Dead after 7 mins.	Alive even after 24 hrs.
M|100,000	Emetine + ,, (1 in 200,000)	Alive even after 64 hrs.	..

N.B.—*Controls.* Active cultures of *P. caudatum* were kept in presence of equal strength of the alkali and were found to be alive and active for 48 hours.

Equal volumes of the alkaloidal solutions, culture, and alkali were taken and therefore the actual concentration of alkali in the preparation was N|600.

pH of culture of *P. caudatum*	=	6.8
,, ,, Conessine hydrochloride ..	=	4.8
,, ,, N|200 NaOH	=	11.9
,, ,, N|600 ,, ...	=	11.5
,, ,, Emetine hydrochloride ..	=	6.8

(*b*). Free-living amœbæ were cultured in Clegg and Musgrave's medium. The culture from the plate was picked up by means of a platinum loop with a diameter of 3 mm. The experiments were generally carried out in the same way as those with *Paramœcium*, except that the observations were made on the warm stage of a microscope. The amœbæ were a mixture of *proteus* and *limax*.

Results with free-living amœbæ.

		In presence of N|200 NaOH.	In absence of alkali.
	(a) *Conessine.*		
M|10	Conessine + a loop of culture. (1 in 28)	Instantaneous death.	Death in 5 secs.
M|100	Conessine + ,, (1 in 280)	Dead after 2 to 4 secs.	Dead after 30 secs.
M|1,000	Conessine + ,, (1 in 2,800)	Dead after 1 min.	Dead after 3½ mins.
M|10,000	Conessine + ,, (1 in 28,000)	Dead after 3 mins.	Alive even after 1 hr.
M|100,000	Conessine + ,, (1 in 280,000)	Dead after 11 mins.	Alive even after 1 hr.
	(b) *Emetine.*		
M|100	Emetine + culture (1 in 200)	Dead after 10 secs.	Dead after 1 min.
M|1,000	Emetine + ,, (1 in 2,000)	Dead after 7 mins.	Dead after 30 mins.
M|10,000	Emetine + ,, (1 in 20,000)	Alive even after 30 mins.	Alive even after 1 hr.

N.B.—The final concentration of the alkali in the solution under test was about N|400. Controls were kept and were found to be alive and active after one hour.

pH of N|400 NaOH .. .. = 11.7

Experiments with Trichomonas hominis.

(*c*). A culture of *Trichomonas hominis* grown in Dobell and Laidlaw's medium for growing *E. histolytica* (i.e., inspissated serum covered with Ringer's and egg albumen) was used.

		In presence of N|200 NaCH.	In absence of alkali.
	(a) *Conessine.*		
M|100	Conessine + culture of *Trichomonas* (1 in 280)	Immediate death.	Dead with in 3 mins.
M|1,000	Conessine + ,, (1 in 2,800)	Dead after 25 secs.	Dead after 7 mins.
M|10,000	Conessine + ,, (1 in 28,000)	Dead after 48 mins.	Alive even after 1 hr.
M|100,000	Conessine + ,, (1 in 280,000)	Alive even after 1½ hrs.	Alive even after 1½ hrs.
	(b) *Emetine.*		
M|100	Emetine + culture of *Trichomonas.* (1 in 200)	Dead in 1 min.	Dead in 4 mins.
M|1,000	Emetine + ,, (1 in 2,000)	Dead after 13 mins.	Dead after 1½ hrs.
M|10,000	Emetine + ,, (1 in 20,000)	Alive even after 45 mins.	Alive even after 1½ hrs.

N.B.—Controls were kept in the presence of alkali and the flagellates were found to be alive after 3 hours. The final concentration of alkali in the solution under test was about N|600 (pH 11.5).

pH of Trichomonas culture .. = 6.45

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We also tried the effect of these alkaloids on the free-living flagellate, *Bodo*, and found that both conessine and emetine had a more toxic action on this organism, the former killing in dilutions of 1 : 280,000 and emetine killing in 1 : 20,000 in alkaline medium.

Dale and Dobell (1917) observed that *E. histolytica* can sometimes withstand a 1 per cent. solution of emetine for half an hour. Dobell and Laidlaw (1926) tested the action of the ipecacuanha alkaloids on cultures of *E. histolytica* and found that emetine and cephæline alone of all the substances tested are able in very weak concentrations (1 in 50,000) to kill this amœba if allowed to act for sufficient time; further that *E. histolytica* alone of all the entozoic amœba studied is killed by such weak solutions of emetine. Emetine therefore has a specific action on *E. histolytica* cultures.

(*d*). We tested the comparative toxicity of conessine and emetine on these amœbæ, but in our experiments we used flakes of mucus from infected kittens containing *E. histolytica*. The solutions of the alkaloid were brought into contact with these on the warm stage of a microscope and the effects were carefully noted.

Results with E. histolytica.

		In presence of N|200 NaOH.	In absence of alkali.
(a) *Conessine.*			
M|100	Conessine+a loopful (1 in 280)) of the stools.	Instantaneous death.	Dead after 2 mins.
M|1,000	Conessine+ (1 in 2,800) ,,	Dead after 1 min.	Dead after 5 mins.
M|10,000	Conessine+ (1 in 28,000) ,,	Dead after 5 mins.	Dead after 10 mins.
M|100,000	Conessine+ (1 in 280,000) ,,	Dead after 8 mins.	Dead after 18 mins.
(b) *Emetine.*			
M|100	Emetine +a loopful (1 in 200) of the stools.	Dead after 12 mins.	Dead after 20 mins.
M|1,000	Emetine + (1 in 2,000) ,,	Dead after 17 mins.	Dead after 25 mins.
M|10,000	Emetine + (1 in 20,000) ,,	Dead after 20 mins.	Dead after 45 mins.
M|100,000	Emetine + (1 in 200,000) ,,	Dead after 25 mins.	Alive even after 45 mins.

N.B.—The final concentration of the alkali in the solution under test was about N|400 (pH = 11.7). Controls were kept and the amœbæ in flakes of mucus were found to be alive and active after one hour when in contact with alkali and after three hours in the flakes alone.

From these series of experiments it will be seen that *P. caudatum* is killed in two minutes by 1 in 28,000 of conessine in an alkaline solution and 1 in 20,000 of emetine in 7 minutes under similar conditions. In the absence of alkali, the toxic effect was considerably weaker. In the case of the free-living amœbæ (*proteus* and *limax*), conessine proved lethal in 1 in 280,000 dilutions in alkaline solution as compared with 1 in 2,000 of emetine. In the case of intestinal flagellates, e.g., culture of *Trichomonas hominis*, neither of these alkaloids had any marked effect. In case of *E. histolytica* our experiments show that emetine kills these amœbæ present in flakes of mucus in dilutions of 1 in 200,000, and conessine is lethal in 1 in 280,000 in presence of alkali.

Effect of conessine on B. dysenteriæ (*Flexner*).

A Rideal Walker test was done and the results are tabulated below.

	2½ mins.	5 mins.	7½ mins.	10 mins.
Absolute Phenol ..	–	–	–	–
Conessine M|100 (1 in 280) ..	+	+	–	–
Conessine M|1,000 (1 in 28,000) ..	+	+	+	+
Conessine M|10,000 (1 in 28,000)	+	+	+	+
Conessine M|1,000,000 (1 in 280,000)	+	+	+	+

+ = growth – = no growth.

With conessine M|100 (1 in 280) all the bacilli (*B. Flexner*) were killed in 7½ minutes. As the alkaloid did not show any marked effect on the enteric group of bacteria no further experiments were performed.

Local Effects.

Subcutaneous or intramuscular injections of conessine salts set up marked œdema of the area round the site of injection. There are signs of congestion and hyperæmia at the site of injection, but no hæmorrhage or necrosis of tissues was observed even when 6 per cent. solutions were injected. The effects were visible a few hours after the injection, began to show signs of resolution after 24 hours, and disappeared almost completely after 48 hours.

Alimentary System.

Conessine has a bitter taste. When administered by the mouth it appears to have a depressing action on the digestive ferments. We tested the effect of the alkaloid *in vitro* on:—

Ptyalin.—Equal volumes of a 1 in 10 solution of saliva and a 1 per cent. solution of starch were taken in a series of 6 test tubes and conessine in mgms. was put into each tube so as to give different dilutions. These tubes were incubated in a water bath at 40°C. and readings were taken on a paraffined white plate every five minutes, mixing one drop of the solution from the test tubes with one drop of iodine solution and noting the end point when the blue colour of starch iodide ceased to appear. In the control tube with no conessine digestion was complete in 20 minutes, but starch was still present in the two test tubes containing 0.2 mgms. (1 in 10,000) of conessine and 0.4 mgms. (1 in 5,000) of conessine, showing that the action of ptyalin was inhibited.

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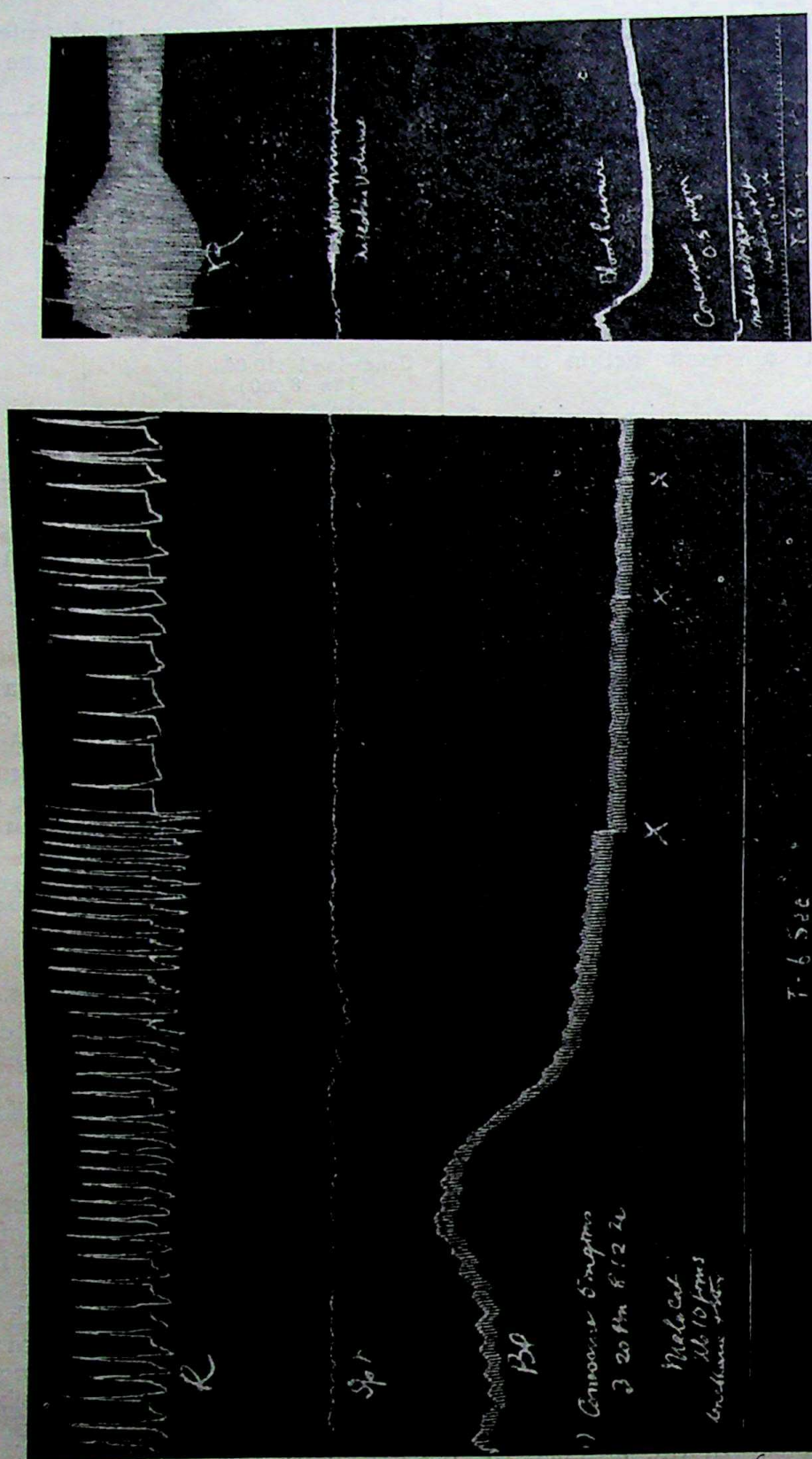
Pepsin.—2 c.c. of a solution of 0.25 per cent. of pepsin in 0.2 per cent. HCl in water were put into a series of seven test tubes. One was kept as control, 1 c.c. of distilled water being added to it. Conessine was put into the other six test tubes so as to give different dilutions from 1 in 5,000 to 1 in 60,000, the amount in each test tube being made up to 3 c.c. Fifty mgms. of dried carmine stained fibrin were put into each tube and the whole lot transferred to a water bath kept at 40°C. After half an hour the tubes were taken out and the amount of digestion that had taken place in each tube was noted by the depth of pink carmine colour discharged by the fibrin in the process of digestion. Dilutions from 1 in 60,000 to 1 in 15,000 did not apparently interfere with the digestion but stronger concentrations up to 1 in 7,500 retarded it; in concentrations of 1 in 5,000 no digestion occurred.

Trypsin.—The effect of conessine on the digestion of proteins by trypsin was noted in

Graph I.

BLOOD PRESSURE, RESPIRATION, ETC.



(2)

(1)

(1) 5 mgms. conessine given into femoral vein causes the blood pressure to rise momentarily. This is followed by a marked fall which is persistent. The respiration is first stimulated but subsequently greatly depressed and slowed. (Drum stopped at X.)

(2) 0.5 mgms. conessine has produced a persistent fall of the blood pressure. The respiration is at first greatly stimulated and the depressed and slowed. Peristaltic movements of the intestines are augmented.

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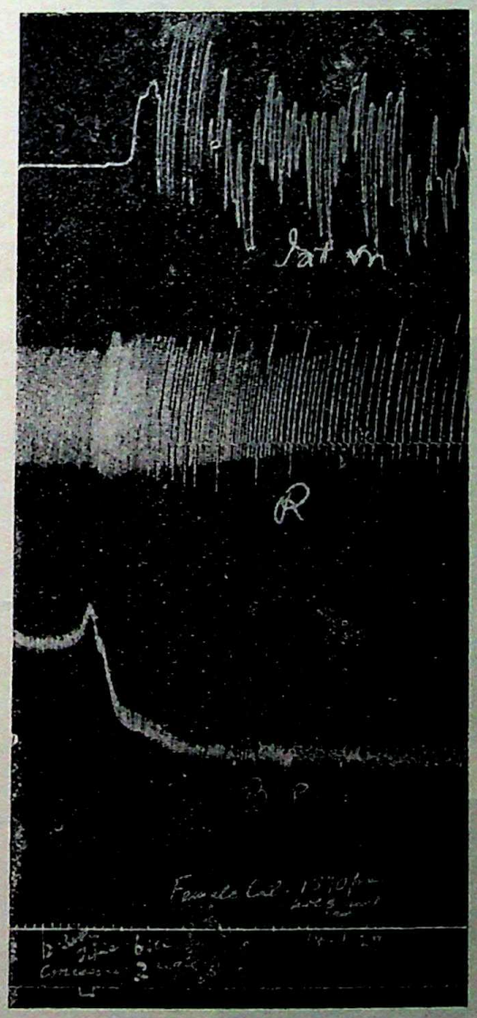
the same way. Tubes containing dilutions from 1 in 40,000 to 1 in 2,500 of conessine were put up. There was slight inhibition with a dilution of 1 in 7,500, while dilutions of 1 in 3,000 and 1 in 2,500 definitely retarded digestion. Conessine, therefore, inhibits the activity of digestive ferments. Preparations of *kurchi* when given by the mouth should be preferably given two hours or so after meals so that digestion is as little interfered with as possible.

In intact animals under experimental conditions conessine has no effect on the intestinal volume, but it markedly stimulates the peristaltic movements of the intestine *in situ* after intravenous injection and of the isolated pieces of intestine (*see* Graphs I and II). In

Graph II.

BLOOD PRESSURE, RESPIRATION AND INTESTINAL MOVEMENTS.



2 mgms. conessine caused marked augmentation of intestinal movements (*in situ*) after adrenaline.

concentrations of 1 in 100,000, the tone of the gut is increased, while 1 in 20,000 markedly augmented the amplitude of the movements. In stronger concentrations (1 in 10,000) the organ went into a state of tonic contraction. The action of conessine therefore differs from that of emetine which produces relaxation of the gut and decreases peristaltic movements. The spleen volume was not affected but the rhythmic movements of this organ were increased.

Circulatory System.

Cold-blooded animals.—The alkaloid was given intravenously into the inferior vena cava of the frog. Large doses such as 5 mgm. produced a marked depressent action on the auriculo-ventricular bundle, the heart beats were markedly slowed and there was one beat of the ventricle to 3 to 5 beats of the auricle. Later the auricles went on beating quite independently of the ventricles, complete heart block having been established. The isolated heart of a turtle when perfused with a solution of conessine hydrochloride showed marked slowing and decrease in the amplitude of the beats.

In the mammalian heart small doses produced a temporary increase in the amplitude of both the auricular and the ventricular contractions when observed with the myocardiagraph, but this was quickly followed by depression (Graph III). The heart was also visibly slowed even after 2 mgm. given intravenously. When repeated injections were given so as to produce cumulative effects, irregularity of rhythm was noted. After a total of 15 mgm., weakening and marked slowing of both the auricular and ventricular beats were noticed; the ventricles were beating irregularly and there was a tendency for them to remain in a diastolic condition (Graph III). After a total of 30 mgm. was reached definite heart block was observed, the auricle beating twice as often or more to every ventricular beat. After 45 mgm. there was marked irregularity, the auricles showing incomplete contraction and filillary twitchings; the blood pressure fell to zero. After 50 mgm. the auricles and ventricles were seen to be beating quite independently but the contractions were feeble, hardly any blood being expelled; (Graph III).

Cardiometer experiments showed slight momentary increase in the force of heart beat as well as slowing, but this was followed by depression (Graph IV).

Perfusion of the isolated mammalian heart with 1 in 10,000 solution of conessine showed marked slowing with prolongation of diastole and irregularity of rhythm (*see* Graph V). With greater dilutions such as 1 in 50,000 and 1 in 60,000, after a latent period of about 6 to 7 minutes both the amplitude and the force of contraction were decreased and there was well marked slowing of the heart. Dilutions of 1 in 120,000 and above did not produce any result. This is interesting as injections of large doses of conessine (100 mgm. in a kitten weighing 1,500 grams) did not produce much

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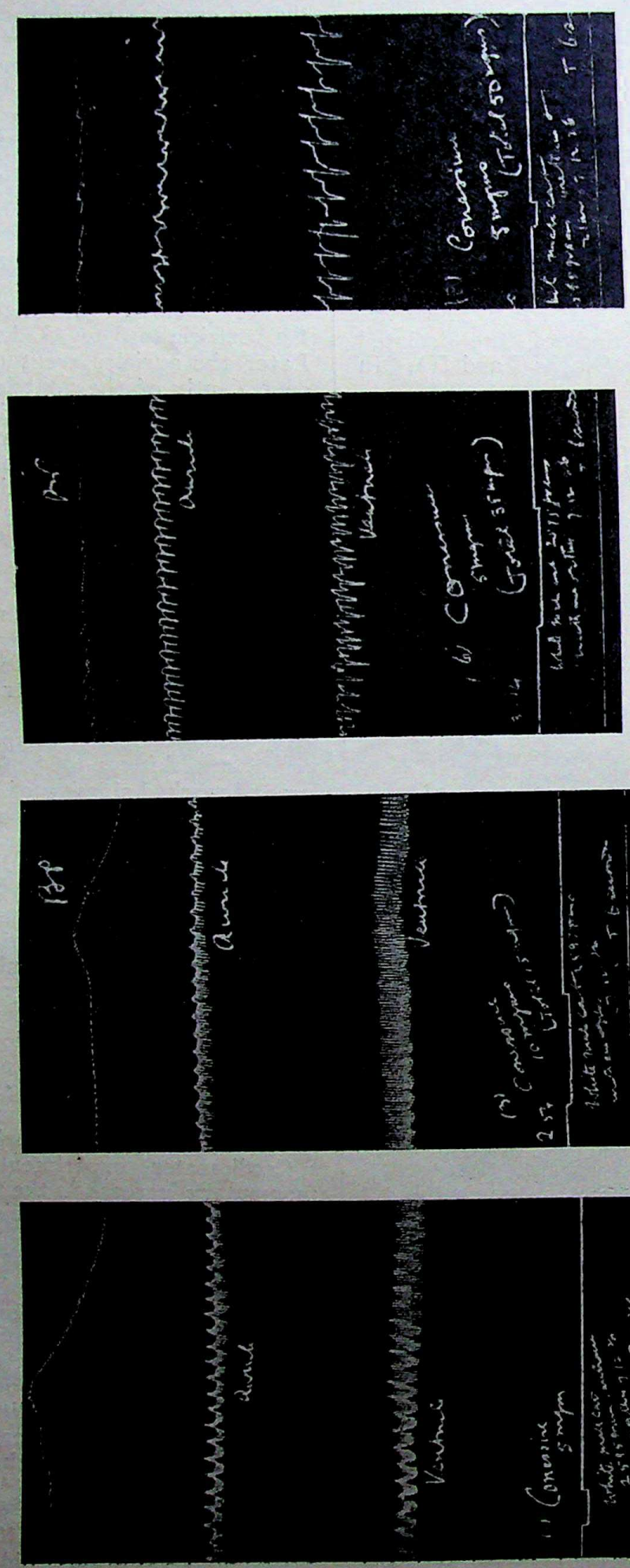
depressing action of the heart and the animal was quite well 24 hours later. The concentration of conessine in the blood would not in this case be less than 1 in 120,000.

Graph III.

MYOCARDIOGRAMS.



(1) (2) (3) (4)

(1) Shows initial stimulation of both auricle and ventricle. (2) The blood pressure has also improved in amplitude. (3) Shows marked slowing of the heart, and relaxation of ventricle. (4) Shows marked irregularity of the heart. (4) Shows feeble auricular twitchings, marked ventricular slowing due to heart block.

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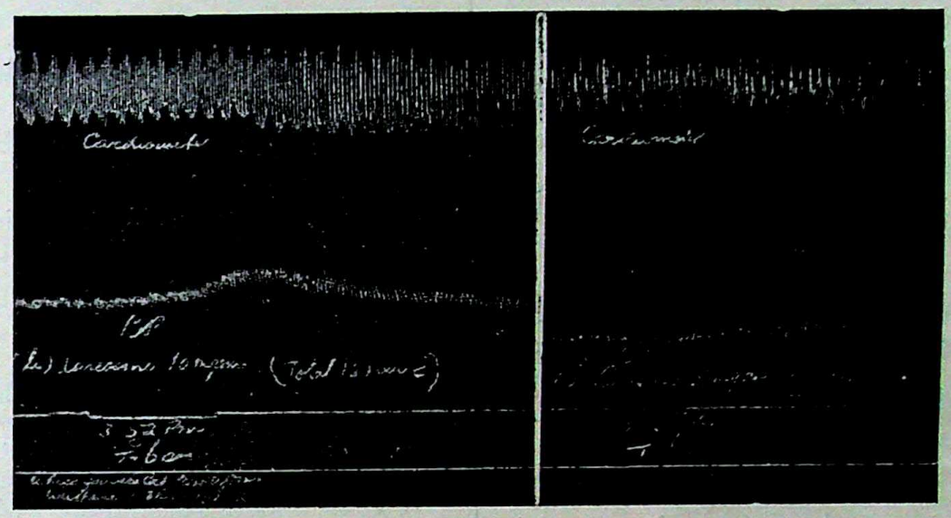
These experiments show that the mammalian heart is momentarily stimulated by conessine in small doses; this is followed by depression which becomes more marked as the dose is increased. The drug appears to act directly on the fibres of the auriculo-ventricular bundle causing slowing and increase of diastolic pause, arhythmia and finally heart block.• That the slowing is not due to any action on the vagal endings in the heart is seen from the fact that it occurs even after section of the vagi or paralysis of the terminations of this nerve by previous administration of atropine. Adrenalin produces its usual effect even after large doses of conessine, and conessine produces its usual effect after ergotoxin, so that the sympathetic fibres in the heart and blood vessels do not appear to be affected by this alkaloid.

Intravenous injections of conessine invariably produce a marked and persistent fall of blood pressure after a slight momentary rise. With very small doses like 0.25 mgm. to 0.5 mgm. there is a tendency to recovery after the fall, but with higher doses the fall is more or less persistent, the blood pressure never regaining its normal level. Section of the vagi or paralysis of their terminations with atropine does not alter its effects on the heart or the blood pressure. The preliminary rise of blood pressure, though slight, is quite appreciable and is seen in every case, even after injection of large doses. The smallest rise noted is 10 mm. and the highest 20 mm.; the duration

Graph IV.

CARDIOMETER.

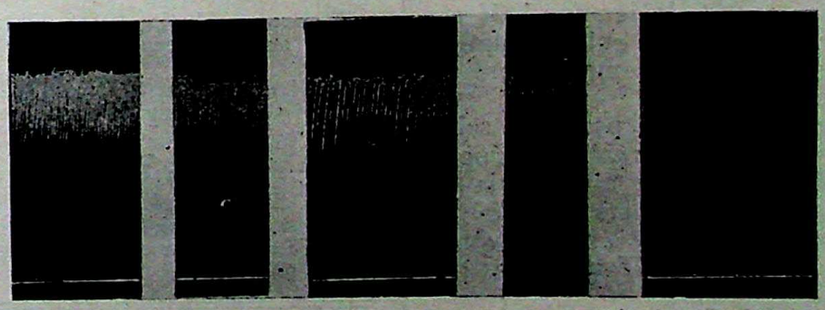


(1) (2)

(1) Force of contraction of the heart increased temporarily. Marked slowing. Blood pressure raised. (2) The primary stimulation is soon followed by depression. Further injections produce marked slowing and irregularity. The blood pressure is lowered.

Graph V.

PERFUSION ISOLATED HEART (CAT).



(1) (2) (3) (4) (5)

(1) Conessine 1 in 60,000. (2) 3 minutes later diminution of amplitude. (3) 3 minutes and 18 seconds. later heart slowed and rhythm irregular. (4) 3 minutes and 24 seconds. later. Great depression. (5) Conessine 1 in 12,000 at arrow mark. Heart greatly depressed and irregular.

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of the rise varies from 17 to 42 seconds. Perfusion of the frog's blood vessels through the aorta shows definite constriction of all the peripheral blood vessels. The kidney volume as well as the limb volume in the intact animal show a slight decrease. The preliminary rise of blood pressure is in all probability due to the vaso-constriction produced and the transient stimulation of the heart. The vaso-constriction is probably due to the direct action of the drug on the vessel walls. The subsequent fall of blood pressure is explained by the depression of the heart and the marked slowing with prolongation of diastole, due to decreased irritability and conductivity of the auriculo-ventricular bundle and the heart muscle. This action of conessine is much stronger than even that of quinidine.

Conessine has no effect whatever on the pulmonary blood pressure.

Respiratory System.

There is a preliminary stimulation, followed by depression and slowing (Graph I). With large doses, respiration becomes slow and shallow and finally stops much earlier than the heart.

Central Nervous System.

Conessine has a well marked narcotic action on frogs. Five to 15 mgm. injected into the lymph sac of an animal weighing 100 grammes produces sluggishness in a few minutes, followed by paralysis of the movements and loss of all reflexes. These amphibia become completely narcotised in 10 to 20 minutes and usually succumb if large doses have been given. In mammals narcosis is not produced, even after large doses. Conessine does not block conduction of impulses in motor nerves even after they have been allowed to remain in contact with a six per cent. solution for half an hour. A two per cent. cocaine solution under similar conditions produced complete nerve block in 5 minutes.

Local anæsthetic action.—A 5 per cent. solution dropped into the eye of a rabbit produces irritation followed by complete anæsthesia in 6 to 12 minutes. The effect lasts from 30 to 45 minutes. Weaker solutions only produce partial anæsthesia even after 15 minutes.

Summary and Conclusions.

1. Conessine has a specific action on *E. histolytica* obtained from the stools of infected kittens. It kills these organisms in mucus flakes in dilutions of 1 in 280,000 in 8 minutes in the presence of an alkali and in 18 minutes in the absence of alkali. Emetine under similar conditions kills *E. histolytica* in dilutions of 1 in 200,000, but in the absence of alkali such dilutions have no effect on this entozoon. In view of these findings it is concluded that this alkaloid may prove to be of great use in the treatment of amœbic dysentery.

2. In the case of intestinal protozoal flagellates such as *Trichomonas hominis*, conessine had little toxic effect, though on free-living flagellates such as *Bodo*, its effect was as marked as on *E. histolytica*.

3. Conessine salts (hydrochloride, hydrobromide and tartrate) can be given subcutaneously and intramuscularly. One to six per cent. solutions of such salts produce only slight local effects. No necrosis of tissues was observed.

4. The alkaloid has an inhibiting action on the activity of the digestive ferments, such as ptyalin, pepsin, and trypsin.

5. Conessine salts when given intravenously possess a marked depressing action on the tissue of the auriculo-ventricular bundle and in large doses produce irregularity, incoordination, increase of diastolic pause and heart block. Even small doses given in this manner to cats produced a marked and persistent fall of blood pressure after a preliminary transient rise. These effects were not noticed when the drug was given intramuscularly or subcutaneously, and experiments show that in dilutions of 1 in 120,000 such as would be expected to occur in the blood, it has no effect on the isolated mammalian heart. The drug could therefore be administered by these routes for therapeutic purposes, but its intravenous administration is not recommended.

6. The alkaloid has no marked effect on the central nervous system of mammals.

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A Mirror of Hospital Practice.

A CASE OF SPASTIC PARAPLEGIA TREATED SUCCESSFULLY BY INJECTION OF BENIGN TERTIAN MALARIA.

By F. H. B. NORRIE, M.B., CH.M., F.R.C.S. (Eng.),
Medical Officer, The Angus Company, Ltd., P. O. Angus, Hooghly.

History.—Ram Raj, aged 40 years, Hindu male, an inhabitant of Chapra, living in Titta-ghur (Bengal) for the past 20 years, was

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carried to the Angus Outdoor Dispensary on the 18th of June, 1926. He had syphilis some 20 years ago for which he was treated by village doctors. He has always been of active habits and was once a wrestler. The present disability commenced as a weakness in both legs some 18 months ago. For the past six months he had been unable to walk or stand, and on admission was unable to move either leg.

Physical Examination.—The patient was well nourished and of average intelligence—no atrophy of muscles. There were no sensory disturbances except in the legs, where owing to the rigidity present there was some pain when he attempted to move.

Reflexes.—Knee jerks exaggerated. Ankle clonus easily obtained. Babinski is just present. Rectus clonus present. Sphincters unaffected—potency maintained. Upper extremities, no change. Eyes, no change.

The rigidity in the legs was most marked in the morning and they had to be massaged before he could get up from his bed. All these symptoms came on gradually until the spasticity was so great that the patient had to be carried about. The Wassermann reaction of the peripheral blood was 50 per cent. positive.

Treatment.—Bismostab, beginning with ½ c. c. once weekly up to 1 c. c.; 10 injections being given. Patient intolerant to iodides in any form and in any dose. The Wassermann reaction of the peripheral blood done after 6 Bismostab injections was found negative, but that of the cerebro-spinal fluid was 25 per cent. positive.

1st July, 1926.—0.5 c. c. of a 48-hour culture of benign tertian malaria injected intravenously.

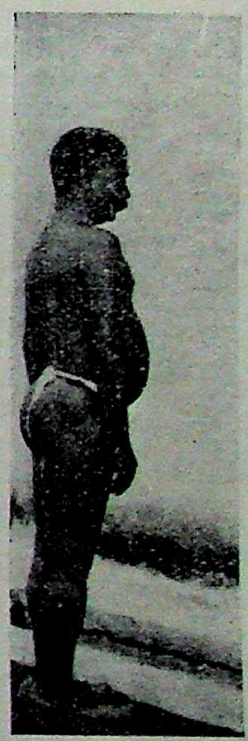
Result.—The patient had a rise of temperature on the 9th day after the injection, his peripheral blood showing *Plasmodium vivax* parasites. The fever subsided spontaneously without treatment after a few paroxysms and the peripheral blood was negative for parasites. The patient was able to stand up and walk a few paces with the help of a stick.

2nd September, 1926.—2 c. c. of whole blood from a patient (Wassermann reaction negative) suffering from benign tertian malaria was injected intravenously.

After the second injection of malaria the patient had a rise of temperature on the 5th day and had several paroxysms of fever, lasting for two weeks. The patient then discarded the stick altogether and was able to walk about the hospital ward and to help other sick patients. His cheerfulness has returned. He was put on Mist. Cinchona Febrifuge, grs. 10, t.d.s. for one week only (a total of grs. 210).

After two to three weeks exercise he was able to walk a distance of one mile without sitting down and he has since returned to his former employment.

In conclusion we would state that we do not believe that the whole of the improvement was



due to the anti-syphilitic treatment alone, for although the Wassermann reaction of the blood was negative after six Bismostab injections and there was some improvement in his general condition, this remained stationary in spite of the continuance of the anti-syphilitic treatment for nearly two months more. The real turning point in the course of the disease was noticed immediately after the injection of the second dose of malarial blood followed by its paroxysms of fever. While this patient

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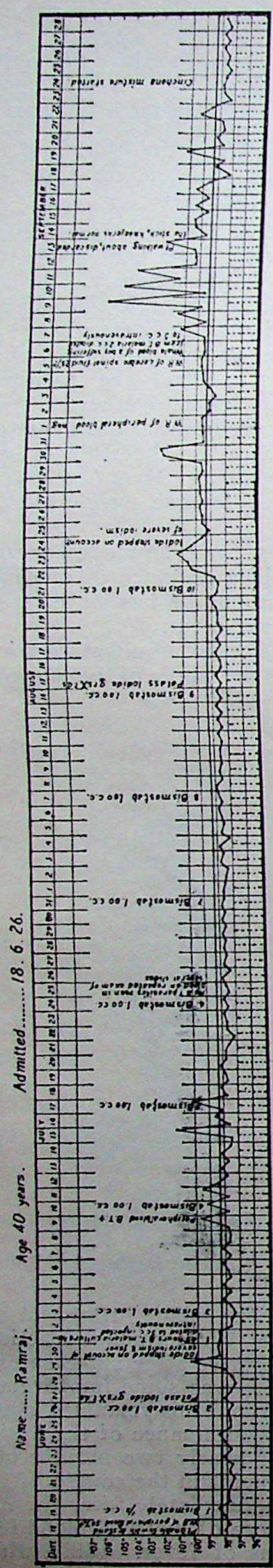

was under treatment we had not heard of the treatment of spastic paraplegia by malaria, nor had we then read the paper delivered before the Royal Society of Medicine by Dr. G. de M. Rudolf in July 1926 and were in consequence in ignorance regarding the technique and dose of parasites usually given. In spite of this the happiest results attended our venture into the realm of experimental medicine.

28th September, 1926.—The photographs were taken after the patient was discharged and on this day he had come from Tittaghur and returned there in the evening.

A CASE OF QUININE INTOLERANCE.

By CH. KRISHNAMURTY, L.M.P.,
Sub-Assistant Surgeon, Sompeta, Ganjam District.

M. H., 30 years of age, male, came to me complaining of feverishness and pains all over the body. Temperature normal. A dose of a mixture of quinine (5 grains) with 2 drs. of magnesium sulphate to the oz. was given. Within about 10 minutes after he had taken the mixture he was seized with violent sneezing and blocking of the nostrils. His face was swollen and flushed and he complained of inordinate itching from head to foot. There was a severe urticarial rash all over the body. The patient was nearly mad, unable to sit or stand in one place. A few inhalations of ammonia, an injection of adrenalin and a mixture of a few doses of calcium chloride relieved him in a few hours. Externally a viscid solution of ripe tamarind (*Tamarindus indicus*) with a few copper coins soaked in it was applied. This is a recipe known to every Indian mother and I have seen it giving great relief. I am not aware of any similar preparation in the British Pharmacopœia. The patient was all right by the next day.

A CASE OF DERMATITIS EXFOLIATA CURED BY THE INJECTION OF UREA-STIBAMINE (BRAHMACHARI).

By F. H. B. NORRIE, M.B., Ch.M., F.R.C.S. (Eng.),
Medical Officer, The Angus Jute Mills,
Hooghly District, Bengal.

EKCOWRI SETT, Hindu male, aged 50, originally a grocer by profession, about 20 years ago began to feel intense itching of the scalp which was relieved by combing; this led to the shedding of profuse scales. Itching and scaling were most marked during the summer. After a lapse of two years the condition began to spread down on to the forehead, cheek, chin, neck, not sparing the inside of the ears. Gradually during the course of eight years it spread all over the body in patches, the distribution of which was irregular. The patient

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tried all manner of general and local treatment but obtained no relief. Treatment by arsenical compounds in the belief that the condition was syphilitic greatly aggravated the symptoms.

When the patient came to us the eruptions had the following characters:—

Distribution.—Most profuse on the scalp, face and neck, irregularly scattered patches over the front of the chest, legs and hands, only one small patch about the size of a 2-anna silver bit on the back.

Character of the eruptions.—Dry scales on hyperæmic bases, no discharge on peeling.

Diagnosis.—Syphilis was eliminated by the Wassermann reaction which was absolutely negative. The character of the profuse scales, the ubiquitous distribution, together with the absence of any induration and infiltration and the marked redness pointed to the diagnosis of a typical case of dermatitis exfoliata.

Treatment.—The only known drug treatment of the disease had been vinum antimoniale per mouth. The discovery of a potent pentavalent antimony salt of late years naturally suggested his line of treatment and he was submitted to a full course of Urea-Stibamine (Brahmachari). Strangely enough after a few injections the itchiness completely disappeared, the skin assumed its normal hue, the scales began to disappear and within the course of two months there was practically no sign of the disease left. Altogether he got 2.10 grammes of Urea-Stibamine.

A CASE OF INTESTINAL OBSTRUCTION.

By NARANJI M. GHELLANI,
Sub-Assistant Surgeon, Sanakhada Dispensary, Kathiawar.

THERE have recently been reported in the *Indian Medical Gazette* cases of acute intestinal obstruction ending in spontaneous recovery, such for example as that reported by Dr. Pande in the issue for March 1926. I have met with a similar case recently, details of which were as follows:—

Damodar Kalidas, a Hindu male, aged 33, was admitted to hospital on the 31st October 1926 with griping pain in the right lumbar region, radiating to the epigastrium, but not referred to the pubes, nor did it start from behind the right loin, so that renal and hepatic colic could apparently be eliminated. He was given castor oil and an injection of morphia and atropine, which relieved the symptoms.

On the 2nd November similar symptoms set in in the same site in an aggravated form. Morphia and atropine were given and an enema of soap and turpentine. This caused copious evacuations, the symptoms disappeared, and for the next fortnight the patient appeared to be doing well.

On the 20th November the same symptoms recurred with greater severity than ever. As he refused to take an enema, he was given morphia and atropine again and a sedative mixture containing belladonna was prescribed. Castor oil and an enema were given the next day, but only small evacuations—one of which contained a little blood—resulted. A tender swelling now became apparent in the appendicular region, but there was no fever, and the pulse was only 84. The belladonna mixture was continued and an ointment of belladonna and ichthyol applied locally to the abdomen, with hot fomentations.

On the 22nd hiccough and vomiting commenced, and he was given small doses of tincture of iodine orally. On the 23rd the griping pains were very severe, but he had a fair amount of sleep for the next few nights. Meantime an enormous swelling appeared along the whole of the ascending colon and across the umbilicus to the left side, and the occasional enemas which the patient permitted brought away only a few small fæcal masses. The relatives actually went to the length of having the skin over the swelling cauterised in the hope of reducing it.

The patient was now advised to go to Bombay for operation. The case appeared to be one of chronic intussusception or volvulus. The absence of fever excluded appendicitis, I had tried santonin, but no round-worms were expelled. There was neither rigidity nor acute distension of the abdomen. Visible peristalsis was now present in the abdomen.

On the 9th December Dr. C. G. Mahadevia, M.B., B.S. (Bombay), saw the patient in consultation, agreed with the diagnosis of probable chronic intussusception, and also suggested operation. In the meantime a chlorine mixture was prescribed orally—as the patient demanded medicine by the mouth—and the massage of the abdomen with the belladonna ointment persisted in. To my great surprise, however, the patient now commenced to recover, and could lie on either side in comfort, which he had not been able to do before. On the 11th December all swelling in the abdomen had cleared, and on the 18th he was back on a full diet. (During his illness he had been restricted entirely to a fluid diet.)

I do not think that the administration of Mist. Chlorinæ could have had anything to do with his recovery. In the belladonna prescription first prescribed, the dose of tincture of belladonna was gradually raised to 40 minims, and possibly this may have had some effect. The regular rubbing of the abdomen with a belladonna ointment appears to have been efficacious. The absence of fever, presence of visible peristalsis, the increasing

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swelling over the colon, the fact that enemas only brought away small fæcal concretions, the occasional passage of a natural motion—in some instances accompanied by a little blood and mucus—all suggested chronic intestinal obstruction.

A CASE OF OPACITIES OF THE LENS OCCURRING AS A SEQUEL TO AN ATTACK OF KALA-AZAR.

By B. N. BHADURI, M.B.,

10-A, *Wellington Street, Calcutta.*

THE patient, Mr. H. S., aged 22 years, was sent to me by his family physician for failing sight of a month and a half's duration.

History of the Case.—About ten months previously he had been diagnosed as a case of kala-azar on the strength of a blood examination report. Before this diagnosis was given he had been treated for malaria with quinine and soamin for a long time without benefit. The kala-azar was treated by 22 injections of sodium antimony tartrate over a course of four months and he was then declared cured.

Two months subsequently he commenced to get frequent attacks of headache, with lacrimation and a burning sensation in both eyes, and for the past six weeks he had been suffering from failure of vision. Judging from the report from the ambulance corps, the patient's vision had been normal before his illness.

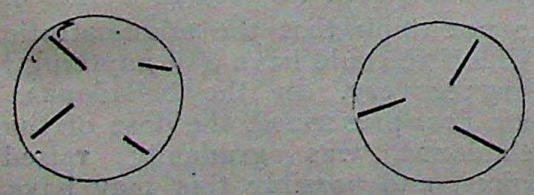
Examination.—Ocular tension normal, corneæ clear, the pupils equal, reacting to light and to convergence, the conjunctivæ and lacrimal sacs healthy.

Refraction:

R. E. D. V. 6/12—0·50 Dcy 180°=6/9 (??) and no further N. V. Su Do 50 at 12° 50 at 12".

L. E. 6/9 c—0·75 Dcy 180°=6/6 (??) Su Do 50 at 12".

Under homatropine, with oblique illumination, white streaks were seen in the cortex of the lens in both eyes. On ophthalmoscopic examination, black streaks of opacity were seen, as shewn in the attached diagram, radiating from the periphery towards the centre.



The patient's urine was subsequently examined, but was found to be normal.

The error of refraction was fully corrected. A year and a half later he was again examined and no further diminution of vision was noticed, nor any improvement. The condition of the opacities was the same.

Discussion.—The history of recent origin of the trouble, the previous report on examination that the eye was normal before illness, and the type of opacity present preclude the possibility of congenital cataract. Diabetes can be dismissed, from the general condition of the patient and the absence of sugar from the urine, though a blood-sugar examination was not done. There was no history of trauma or any kind of shock sufficient to start lental opacity. The patient's age was too early for cataract of senile type. Is it possible that it was by a mere coincidence that opacity of the lens should develop as a sequel to kala-azar?

Until we get a number of such cases of development of lental opacity in kala-azar patients, we cannot convince ourselves that the condition was caused by kala-azar; but the fact that a young man, with a normal urine report, should develop cataract after kala-azar—whilst a similar condition is sometimes seen after malaria or ankylostomiasis—urges me to publish the notes upon the case. One point worth mentioning is the very slow progress of the condition after the first examination.

Note.—We have shewn the above report to Lieut.-Col. W. V. Coppinger, D.S.O., I.M.S., Superintendent, Eye Hospital, Calcutta, who remarks that such cataracts in young persons from one cause or another are far from uncommon. They may occur in any condition of profound debility, e.g., after cholera; whilst in the case under report the stationary condition of the lesions corresponds with the improvement of the patient's condition after treatment. The condition is perhaps one of opacities of the lens, but it is essentially cataractous. The case is one of considerable interest. EDITOR—*Indian Medical Gazette.*

PERNICIOUS FORMS OF MALARIA AT SOMPETA, GANJAM DISTRICT.

By CH. KRISHNAMURTY, L.M.P.,

Sub-Assistant Surgeon, Sompeta, Ganjam District.

DURING the year 1925-26 whilst stationed in this district no less then eleven cases of pernicious malaria have come under my treatment. Sompeta is supposed to be one of the healthiest areas in the Ganjam District, yet this experience has been unique. I have previously served for two and half years in the Jeypore Agency, Madras Presidency, which is notoriously one of the worst malarial tracts in India; also for three and a half years in the

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Semi-Agency Tracts of the Madras Presidency, yet in neither area have I seen such severe cases. Although the onset of malaria is preceded by convulsions in many young children—and I can recall having seen as many as forty of such cases in a year and a half at Keraput—yet such prolonged periods of unconsciousness with meningeal symptoms were not encountered during my previous service in the areas mentioned. Several other cases have also been reported to me in Sompeta where treatment by indigenous practitioners has led to disastrous results.

Of the 11 cases, 8 were of cerebral type, 2 of algid type, and 1 of hyperpyrexial type. Of the 8 cases of cerebral type the age and sex distribution were as follows:—

Ages.	46	25	22	20	16	15	7	3.
Sex.	M	M	M	M	M	M	M	F.

The 2 cases of algid type were both males, and both aged about 25 years; the case of hyperpyrexial type was a female child aged about 8 years.

The following are notes on the individual cases:—

Case 1.—Male, aged 45, attacked with fever preceded by chills, and under the treatment of an indigenous physician. One night he suddenly became delirious, began to shout incoherently, leaped from his bed, and ran out of the house. He was controlled with difficulty, and had to be either held down by two or three persons or tied down. When I saw him the next morning his temperature was 102°F. and he was raving like a madman. In spite of having known me previously, he did not recognise me, and treated myself and his attendants to torrents of abuse. A calomel purge, bromides, and oral administration of quinine, with an occasional dose of morphine hypodermically brought about complete recovery in three days.

Case 2.—Daughter of *Case* 1, had a similar type of attack with convulsions and a temperature of over 105°F. She was treated on similar lines and made an uninterrupted recovery.

Case 3.—A boy aged 7, had had fever for two or three days, when he suddenly developed convulsions at about 12-30 p.m. and passed into a state of delirium, with his eyes protruding, congested, and staring, his teeth clenched, and his axillary temperature 106.4°F. Cold sponging to the head with hot sponging to the body, an injection of adrenalin with luminal sodium, were first given. After half an hour's sponging the temperature fell to 104°F., and the child could open his mouth. Calomel in butter and a soap suppository moved his bowels, whilst a bromide mixture was given every three hours. An intramuscular injection of quinine acid hydrochloride with adrenalin was given, and repeated every day for three days. He made a rapid recovery.

Case 4.—Hindu male, aged 15, with sudden pyrexia similar to that in Case 3, and he also made an uneventful recovery.

Case 5.—Hindu male, aged 16. This boy was so delirious that he ran out of the house and fell into a tank and but for those present who fished him out, he would have been drowned. He also made a complete recovery under the usual line of treatment.

Case 6.—A child 3 years of age who suddenly became rigid with convulsions and unconsciousness, and a temperature of 105°F. The child was put into a hot bath, with cold applied to the head. A glycerine enema, a calomel purge, and intramuscular quinine cured the patient.

Case 7.—Hindu male, aged 20. This patient had been in the hands of four indigenous practitioners before I was called in on the 17th day of his illness. He was restless, rolling on the floor, deeply jaundiced, constipated, and with a temperature of 101°F. A brisk calomel purge and a copious soap and turpentine enema moved his bowels, and an intravenous injection of quinine acid hydrochloride with adrenalin was given. The next morning the temperature was only 99°F., and the patient appeared to be doing well. He was put on to quinine in effervescing mixture, but by the next evening he was in a low condition, with signs and symptoms of cerebral irritation, semi-consciousness, and a failing pulse. In spite of all treatment, the patient died.

Case 8.—This was another patient who was treated by four quacks before I was called in, four hours before his death. He was groaning, with an almost imperceptible pulse, his eyes fixed and staring, and his teeth clenched. The rectal temperature was 106°F., and he was unconscious and was passing fæces and urine involuntarily. In spite of three injections of quinine and the free use of cardiac stimulants, he collapsed and died.

Case 9.—Hindu female child aged 8. This was an instance of purely hyper-pyrexial form, with the temperature 106.4°F. and the child very restless. Cold to the head, tepid sponging of the body, and quinine treatment cured the patient.

Cases 10 *and* 11.—These were both of the algid type of malaria in adult males. Both had violent vomiting and purging, with chills and rigors. They passed as many as 15 to 20 stools and vomited the same number of times within a few hours. Treatment with quinine and astringents cured both.

AN UNUSUAL FOREIGN BODY IN THE EAR.

By T. SESHACHALAM, M.R.C.S., L.R.C.P..

Assistant Surgeon, Victoria Hospital, Bangalore.

THE following case deserves to be placed on record on account of its rarity.

Abdul Rahim, a male aged 42, attended the aural department of the Victoria Hospital, Bangalore, at 9 a.m. one morning, complaining that he had been suffering from severe pain in the right ear since 4 a.m. As the ear was found to be full of cerumen, syringing was ordered. On syringing the ear a young scorpion, measuring an inch in length, came out and was found to be alive. The specimen is preserved in the museum of the Victoria Hospital.

I am greatly indebted to Dr. S. Subba Rao, Medical Officer, Victoria Hospital, Bangalore, for permission to publish this case.

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AN INTERESTING CASE OF SYPHILIS.

By V. G. GOPALASAMY,

Assistant Surgeon, Karimnejer, Hyderabad Dominions.

A MALE villager aged 35 years came to me complaining of an enlarged gland in the right groin. The gland was elongated, hard, inflamed, and tender to the touch. He had a temperature of 99°F in the mornings and of 103°F in the evenings. As he gave a history of gonorrhœa, I took the bubo to be of gonorrhœal origin. External medication such as applications of belladonna and thermofuge were applied with no relief; the gland remained hard and swollen. After ten days of fever the patient developed a severe dry cough, aggravated at night. His throat was painted with Mauvel's pigment, and syrup of hypophosphites and a cough mixture given, but his condition became worse. His condition of continued fever, cough, anæmia, and debility suggested pulmonary tuberculosis, but none of the characteristic lung symptoms of that disease were present.

The patient gave a history of syphilis some six years previously, and in order to eliminate this infection I gave four intravenous injection of sulfarsenol, with potassium iodide and hydrarg. perchloride by the mouth. Within 20 days the entire condition cleared up; the bubo disappeared, and also the cough. The symptoms appear to have been entirely due to old standing syphilis.

A CASE OF TUBERCULOUS DISEASE OF THE HIP JOINT.

By KHUSHI RAM,

Assistant Surgeon, in-charge Civil Dispensary, Samrala, District Ludhiana.

A BOY aged 14 years from Dasurga district, Hoshiarpur, was brought to me for operation on the 30th August, 1926. He gave no history of previous injury to the hip joint except that he had jumped into a tank when bathing a fortnight previously and had subsequently felt pain in the hip for some days. The pain then increased and was accompanied by fever.

On examination I found a large cold abscess present near the great trochanter, with slight wasting of the thigh muscles. The joint was rigid and the gluteal fold somewhat obscured. The boy could not turn on this side and his general condition was extremely unsatisfactory. Temperature 104°F.

The next morning he was operated on under chloroform anæsthesia. On deepening the incision a large volume of tuberculous pus came out, and with a long probe I could feel that the bone was eroded with infection of the surrounding muscle tissue and synovial membrane, and destruction of the cartilage. The bone was thoroughly scraped and all caseous debris removed. A counter opening was made, the deeper portions of the wound thoroughly irrigated, and the wound packed with B.I.P.P., and dressed and a long Liston's splint applied with weight extension. A prescription containing tincture of iodine, creasote, calcium chloride and guiacol carbonate was administered orally.

There was no discharge of pus after the operation, but the wound was kept open and packed with B.I.P.P. dressings for a week. It then gradually healed up, whilst the fever disappeared by degrees.

The patient was seen by the Civil Surgeon of Ludhiana on the 20th September, who was of opinion that the case was one of tubercular hip disease and advised tuberculin injections. The patient was given these when his temperature had dropped to normal, and he left hospital cured on the 4th October, 1926. To-day (November 1926) the boy's father informs me that he is quite fit and attending school regularly. An interesting point about the case is that several medical men whom the father had consulted advised against any operation and considered that the patient would die if operated on, owing to his anæmic condition. The medical man who very kindly gave the anæsthetic for me also advised me to discontinue the operation, as the patient's condition on the table was bad. On the contrary my experience of such cases is that the sooner operation is performed, the better, as to leave the pus *in situ* may lead to final ankylosis, and its absorption is a tedious matter taking a long period of time.

A CASE OF "TYPHO-LUMBRICOSIS."

By B. P. BANERJI, M.B.,

The City Pharmacy, 285, Kalighat Road, Calcutta.

THE patient, a child aged 4 years, was first shewn to me in an unconscious state, resembling that of typhoid fever. There was low muttering delirium, subsultus tendinum, pinching at the nose and bed clothes, whilst he tried to bite anything placed in front of his mouth. The eyes were half open and rolling, the pupils widely dilated and not reacting to light. Convulsive movements also occurred at times. The pulse was very weak and the respirations hurried, the extremities cold and the fingers cyanosed: in fact the child appeared to be at death's door. There was involuntary escape of fæces, but a tendency to suppression of urine.

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I gave him at once a powder containing calomel, thymol, and sodium bicarbonate, and a mixture containing adrenalin, strophanthus, and glycothymoline. Both the liver and the spleen were enlarged, and I hesitated before prescribing a routine dose of santonin.

The parents stated that the child had had occasional attacks of malaria, had had broncho-pneumonia a month or so previously, and was always ailing, with bowel complaints and the passing of mucus and of offensive stools for the previous week.

Shortly afterwards the child became violently delirious, began to scream, had to be held down in bed, refused to take any food, and remained in this state for four days. The prescriptions given above were continued. On the third day, however, a round-worm about 6″ in length was passed and immediately the child's condition began to improve.

Throughout his whole illness the one hopeful feature of the case was that the child's condition remained afebrile, but on the fourth day the temperature rose to 100°F and remained elevated for 4 subsequent days. Once the fever had abated and the child was recovering, I administered santonin in fractional doses and five further round-worms were expelled. During his illness a bland fluid diet was prescribed with occasional rectal salines. Later on a general tonic was given and the patient made a slow but uneventful recovery.

A FATAL CASE ASSOCIATED WITH FILARIAL INFECTION.

By KISHORI MOHAN KHAN, M.B.,

Kutchery Road, Gaya.

A HINDU male adult, aged 18, was admitted to hospital suffering from fever and rigors at 5 a.m. on the 4th September, 1926, and I was first called to see the case at 1-30 a.m. on the 5th September. I found the patient lying in a restless, semi-conscious state, irritable, with a temperature of 105°F. The pulse was soft and feeble.

On examination, the spleen and liver were not enlarged, there was no neck rigidity or head retraction, Kernig's sign was negative, and the heart and lungs appeared to be normal. The patient had given a history that he had had two previous attacks of a similar fever with rigors at weekly intervals, each attack lasting for 2 days. The last of these two attacks was 7 days previous to the present one.

The blood was taken for examination, but as this was not possible at night, examination of the films was deferred till next morning. In the meantime the temperature rose to 106.8°F, and did not come down on cold sponging. As it was impossible to examine the films at night a provisional diagnosis of malignant tertian malaria was made, and an intramuscular injection of 10 grs. of quinine hydrochloride given. The temperature then dropped to 103°F, and by 5 a.m. in the morning to 100°F.

On examining the blood films the next morning, no malarial parasites could be found, but a fair number of microfilariæ were present. At 11 a.m. the patient suddenly developed all the symptoms of severe collapse, and in spite of administration of pituitrin by injection, he died at a little later. No post-mortem examination was possible.

The diagnosis is rather obscure, but a condition of septicæmia secondary to filarial infection suggests itself. During the previous 18 years of his life the patient had shewn no symptoms of filarial infection until about 15 days prior to his death.

INTRAVENOUS SODIUM IODIDE IN GOITRE.

By A. V. J. REDDI,

Sub-Assistant Surgeon, Civil and Military Police Hospital, Tiddim, Chin Hills, Burma.

I WAS an eye-witness of the fruitful experiments conducted in the Headquarters Hospital of this district during 1924 by Lieut. E. A. Davies, I.M.D., and Assistant Surgeon Dr. P. Bell, I.M.D. (now Civil Surgeon). After taking over charge of this hospital I repeated these experiments on some patients of this subdivision and obtained good results. Unfortunately the Chins here do not consider goitre a disease at all, inasmuch as it does not incapacitate them from doing their ordinary daily work, and some difficulty is experienced in obtaining a fair number of cases for carrying out the treatment. The following cases have successfully undergone the course, and presented themselves for re-examination also as originally requested:—

Case No. 1. Shewe Lian, aged 12, Chin female, a local resident and so treated as an out-patient. The goitre was of the size of a small mango and is said to be of less than one year's duration. She received six intravenous injections, one every alternate day of six grains of sodium iodide in 5 c.c. of sterilized rain water. Re-examined on 7-12-25. Tumour had disappeared completely.

Case No. 2. Kiem Sei, aged 15, Chin female, local resident and treated as an out-patient. Goitre of the size of a big marble

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and of nearly 10 months duration. Treatment the same as in case No. 1. Re-examined on 7-12-25. Swelling had disappeared completely to all appearance, but a little can be felt on pressure.

Case No. 3. Ning Lian, aged 10, Chin male, admitted as an in-patient on 16-11-25 with a soft goitre of six months duration and of the size of a walnut. Treatment the same as in case No. 1. Discharged on 29-11-25. Re-examined on 5-5-26. No trace of the gland seen.

Case No. 4. Hang Thin, aged 18, Chin female. Admitted on 16-11-25 with a goitre of five months duration and of the size of a small marble. Treatment the same as in case No. 1. Discharged on 10-5-26. The goitre disappeared completely.

Case No. 5. Gin Ching, aged 15, Chin female. Treated both as an out-patient and in-patient. The goitre was of two years duration and the size of a big lemon. Treatment the same as in case No. 1. Discharged on 30-4-26 and re-examined on 30-5-26. The tumour was reduced to nearly the size of a small marble, and may still further be reduced in a month's time.

I publish these cases to show that the introduction of small quantities of iodine into the system reduces the size of the thyroid gland in cases of recent goitre.

In conclusion I am much indebted to Lieut. E. A. Davies, I.M.D., Civil Surgeon, Chin Hill Districts, for affording me the facilities for these trials and for sanctioning permission to publish these notes.

VOMITING CAUSED BY MORPHIA: A NOTE OF WARNING.

By Y. S. ROW, L.M.P.,

Government Headquarter Hospital, Kurnool.

THE action of opium and morphine when given either orally or hypodermically is in many cases to produce a condition of irritability of the stomach and intestine. I have given it and have seen others give it with good success in many conditions due to nervous irritability of the stomach and intestine. But it is not sufficiently realised that it may induce nausea and vomiting.

Hale White in his *Materia Medica and Therapeutics* writes "With a dose of 1|2 or 3|4 gr. of morphia the skin is slightly flushed and often perspires gently, while there may be nausea or even vomiting and a transient increase of intestinal peristalsis." In another passage he writes, regarding the causation of these symptoms, "These are probably due to the morphia being excreted into the stomach and bowel and there irritating, or stimulating the neuromuscular apparatus." W. E. Dixon in his *Manual of Pharmacology* writes "A big injection of morphia may induce nausea and vomiting, and in rare cases even purging." R. Ghosh in his *Materia Medica* writes "At the outset it (opium and morphia) may sometimes cause nausea and vomiting from irritation of the gastric nerves."

From the above authorities it is evident that bigger doses of morphia may set up nausea and vomiting; but in my own experience I have known smaller doses, such as 1|4 gr. to 1|6th gr. set up nausea and vomiting, in some cases with disastrous results. One should be especially careful about giving morphia in cases after operation on the eye and abdomen, for instance. I have even seen the same thing happen when the morphia was given together with atropine, which is supposed to counteract the bad effects of the morphia.

The following two cases are illustrative;—

Case 1.—A patient admitted to a district hospital where I was working in 1920 for cataract, for which he was successfully operated on by the civil surgeon of the district. Half an hour after the operation the patient complained of very severe pain in the operated-on eye, perhaps due to the iridectomy which had been carried out. As he was very nervous and complained of the pain being intolerable, an injection of 1|6th gr. of morphia with 1|200th gr. of atropine was ordered and given. Half an hour later the patient got persistent nausea and severe vomiting set in, with the disastrous result that the eye soon filled with hæmorrhage and had to be enucleated subsequently.

Case 2.—A lady six months pregnant complained of very severe pain down the back of the thighs and along the course of the sciatic nerve, more especially on the left side. One night the pain was so severe that, in consultation with another doctor, I decided to give her morphia 1|6th gr. with 1|200th gr. of atropine hypodermically at about 2 a.m. A quarter of an hour after the injection she was much relieved of the pain and slept soundly for two hours. At 4 a.m. she was seized with severe nausea and vomiting, which lasted till noon that day. I became afraid that she would miscarry and made all arrangements to meet that emergency. Fortunately the vomiting subsided at noon, but for three days I was not satisfied that the danger of miscarriage had passed.

These are only two cases of several in which I have seen the hypodermic administration of small doses of morphia with atropine followed by nausea and vomiting. I now use morphia with the utmost caution and only in cases where subsequent vomiting may not be the cause of disaster, either directly or indirectly.

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One of the cheated chemists with the connivance of the police set up a temporary export bureau and gave an order to the suspected persons. They duly delivered the falsified goods only to find themselves on arrival in the hands of the police.—British United Press.

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Indian Medical Gazette.

MARCH.

CO-OPERATION AGAINST DISEASE.

WE have already referred to the promising work which is being done by the Bengal Co-operative Anti-Malarial Society. Such an experiment deserves the most careful study as it is only by the method of trial and error that the best results in sanitation can be obtained.

So long as the Society directed its efforts against malaria alone there was little enthusiasm; the people of Bengal are too familiar with malaria to be frightened of its ravages. Early in the history of the Society it was found that many villages owed their ill-health to kala-azar much more than to malaria and so treatment centres were opened to deal with the former disease. The results were remarkable and several centres have treated more than a thousand cases each of kala-azar in one year.

There is some evidence that kala-azar can be controlled by the treatment of all the sick and it is interesting to find that the number of attendances in village centres shows at first a rapid increase and then a steady diminution, which is attributed to the prevention of the spread of infection. It may well happen that systematic treatment such as is being carried out in Assam will prove to be the best means of controlling kala-azar, even "if and when" the silver-footed sandfly is proved to be the vector of the disease. An interesting experiment is being carried out by the Calcutta School of Tropical Medicine in a small group of heavily infected villages to observe closely what happens when every case of kala-azar in a defined area is brought under treatment as early as possible.

In Bengal the first widespread movement for the control of kala-azar was carried out, not by Government, but by the private Anti-Malaria Co-operative Society which now numbers more than a thousand branches. Some of the special features of this organisation are—

1. It owes its inception to the enterprise of Rai Bahadur Gopal Chundra Chatterji, M.B., who was formerly Sir Leonard Rogers' second-in-command. Dr. Chatterji possesses the same spirit of dogged determination as his old chief, he has met with much opposition but nothing has deterred him from carrying on his beneficient activities.

2. The Society is based on the principle of co-operation: the inhabitants of each village are induced to band themselves together to combat dirt and disease, they are made to see that the success or failure of their work depends on their own efforts, not on help from outside.

3. There is a minimum of interference with the autonomy of each centre, the chief centre supplies advice and encouragement, but leaves the management of the village centres to the local committees.

4. In addition to measures directed against malaria and kala-azar there is an organisation which deals with cholera and other epidemic diseases. In the case of cholera, just as in the case of fire, a brigade is successful in proportion to the quickness with which it gets into action, hence an effort is made to have immediate information of the outbreak of cholera and to deal with it in the most expeditious manner. It would appear that there is only one central cholera brigade with head quarters in Calcutta, evidently it is intended to make each village centre an anti-cholera brigade; when this is done it should be possible to deal with the beginnings of cholera in every locality where there is a centre, and even if the centre has not all the facilities for dealing with a large outbreak, it can render first aid and inform the public health department of the need for action.

5. Twenty tube wells have already been sunk by the Society and twelve are under construction.

6. There are 34 subsidised medical officers who are paid from Rs. 30 to Rs. 50 a month on condition that they settle down and practise in a given locality. These medical men are free to practise, but are expected to give their services to members of the Society at low fixed rates and to give free treatment to all cases of kala-azar at a suitable centre.

7. The work of cleaning tanks is one of the most important activities of the Society; this is carried out largely by enthusiastic volunteers, whose reward is the greatly improved condition of the villages in which they live.

The above is a bald outline of the activities of these societies, whose watchword is "self help."

The movement has encountered great difficulties and a good deal of opposition, but even the obstacles which have been encountered have often promoted the interests of health, for in some cases the opposition has taken the form of the establishment of rival societies, some of which are doing excellent work. Probably one of the most important influences of the Society has been to arouse a public conscience, which is the first essential for progress in public health.

The example of villages which have been cleansed and restored to health and prosperity will not be lost on other villages, and probably this is the reason why there has been such a rapid increase in the number of the local centres.

Of the total contributions made to the Society—amounting to over a lakh of rupees—no less than Rs. 70,000 has come from the Government of Bengal, while Lord Ronaldshay gave Rs. 10,000 and the Countess of

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Reading Rs. 5,000. The District Board of the 24-Parganas gave Rs. 16,000, so that Dr. Chatterji has no cause to complain of apathy or indifference on the part of public authorities.

The most important point in connection with such experiments is to ensure a sound constitution so that if the guiding hand of the founder is withdrawn the whole movement may not fall to pieces. This point has not been lost sight of by Dr. Chatterji, to whom the villages of Bengal owe a deep debt of gratitude for his efforts on their behalf. The underlying principle of the Society is undoubtedly very sound, and the movement deserves the success which it has already attained.

There is a tendency to forget the vast effort which is being made by the Government Public Health agency, which has less opportunity of advertising its work in public. The work of private agencies like the Co-operative Anti-Malarial Society should help and supplement that of the Public Health Department, and it appears that this is the case in Bengal. Dr. Bentley has been one of the most enthusiastic supporters of the "rival" firm because he believes that it is only by fostering the spirit of self help that progress can be made.

ADVERTISING BY MEDICAL MEN.

THE question of advertising by medical men has been much in the public eye of late. In England the Press has been conducting a vigorous campaign against the General Medical Council because the latter disapproves of the conduct of practising physicians and surgeons who write signed articles in the lay press. The general feeling of the medical profession in England is strongly opposed to this form of publicity, not merely because it is liable to be used as an advertisement by the medical men, but also because the discussion of doubtful points in the lay press is inappropriate. There is not the slightest objection to unsigned articles, nor even to signed articles by non-practising public health officers for the purpose of instructing the public in matters of health.

In India the question of advertising by medical men has also been much to the fore of late. An Indian correspondent who wishes to remain anonymous has sent us a report of a judgment which has recently been pronounced in Karachi in connection with a law suit between two European medical men. It is not necessary to publish names, but as there is a lesson to be learned from the case it is worth while to state the broad facts as reported in the judgment. A well known medical man whom we shall call "plaintiff" sent formal notices of his intention to practise in Karachi. These appeared in several local papers, and one paper without his knowledge or consent referred to him in eulogistic terms. This paragraph should not be taken into account, as he was in no way responsible for it. His action in publishing his intention to practise and in stating his address was regarded by some of the practitioners of Karachi as being an advertisement. One of these whom we shall refer to as "defendant" called plaintiff an advertiser. Plaintiff then took an action against defendant, alleging that he had maliciously slandered him. The judgment of the court was to the effect that the press notices constituted an advertisement and that the statements made by the defendant were justified as being in the public interest. It is quite evident that both medical men considered themselves to be in the right, the unfortunate feature of the case being the washing of dirty linen in public. The lesson to be learned from this is that medical men ought to be extremely circumspect in the matter of publicity in the lay press, and that they should keep out of the law courts as far as possible.

A much more serious case is that in which a leading Indian practitioner of Calcutta has had his name struck off the register by the General Medical Council because he caused a notice to be inserted in the lay press in which he was described as an expert in the performance of the Steinach operation for rejuvenation. The merits of the case and the evidence on which he was convicted are not discussed, but assuming that a medical man causes such notices to be published in the press, his action must be regarded as being exceedingly harmful to the good name of the profession.

Then there is the case of a distinguished doctor of Calcutta who claimed to have sole proprietary rights as the manufacturer of a drug which he had discovered in the course of a research which he was carrying out with the aid of a subsidy obtained from the Indian Research Fund Association.

It is a matter of common knowledge that there is a serious degree of laxity in the matter of advertisement among the medical men of India. Large notice boards in front of the consulting rooms, in which the doctor's qualifications and distinctions are flamboyantly stated are not consistent with the dignity of the medical profession, and it is time that steps were taken for dealing with such breaches of medical ethics.

Probably the reason why so much laxity has been permitted is that the offender's fellow practitioners feel a certain degree of delicacy in reporting such breaches of etiquette, but if the medical profession in this country is to avoid losing caste it will have to purge itself of this class of offence.

The publication of lists of qualifications in telephone directories and the statement of consulting hours is rather a difficult question, but it would undoubtedly be better that nothing that savours of advertisement should appear in a publication which is in the hands of the lay public. The struggle for existence

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among the younger members of the profession is severe and the temptations to advertise are great, but a definite stand will have to be taken, otherwise there will be a serious falling off from high standards of ethics on which the medical profession has rightly prided itself.

A Note to Readers.

The editor of the *Indian Medical Gazette* very much regrets the delay in publication of the current issue. Messrs. Thacker, Spink's press have recently been overwhelmed with work, largely in consequence of publication of annual directories; in fact the press has been working double shifts at night. The annual index for 1926, and the review of the Indian medical year, 1926, both of which went to press for inclusion in the March issue, have unfortunately had to be held over, but will be published with our issue for April 1927.

SPECIAL ARTICLES.

SOME ASPECTS OF THERAPEUTICS IN INDIA.

By R. N. CHOPRA, M.A., M.D. (Cantab.),
MAJOR, I.M.S.,
Professor of Pharmacology, Calcutta School of Tropical Medicine.

(BEING the presidential address to the Section of Medical and Veterinary Research, Fourteenth Indian Science Congress, held at Lahore in January 1927.)

LADIES AND GENTLEMEN,

I consider it my duty in the first instance to express my grateful appreciation of the great honour that you have done me in electing me to occupy the Presidential chair. Not only do I look upon it as a personal honour, but to me it is an appreciation of the institution to which it is my privilege to belong, and which has on two previous occasions during the last five sessions of this Section supplied you with a Chairman. I shall endeavour to serve you to the best of my ability and in this I shall be guided and encouraged by the example of my distinguished predecessors in this chair, some of whom I am very glad to see here to-day.

Some aspects of the subject of drug therapy which I am going to bring to your notice, are important both from a professional and economic point of view. Medicine is an ancient art, and drugs have been used as far back as history can take us. It is impossible to think of medicine as something not connected with treatment, and drugs have from the very beginning formed an integral part of treatment. Not only does a great deal of the success of medical treatment depend on the proper and correct use of drugs, but the success of surgery also has been largely dependent on the development of medicine. Surgery is, in many diseases, only a crude branch of therapy and its greatest achievements have rested on the discovery of such drugs as anæsthetics, antiseptics and disinfectants which play an all-important part in this art.

Although the use of remedies dates back from antiquity, it was only during the last half century that a study of the action of drugs has been undertaken on scientific lines, and rational explanations are now forthcoming after a long period of empiricism. The development of organic chemistry, the systematic study of the relationship of chemical constitution to the physiological action of active principles, have been instrumental in producing a large number of new drugs, some of which have very potent actions on animal tissues. Scientific study means much experimentation, and success only comes after many heart-rending disappointments. The history of materia medica shows many more failures than successes. One has only to remember how many unsuccessful compounds Paul Ehrlich had to prepare and test before he discovered such effective compounds as salvarsan and neosalvarsan.

Irrational Therapy on the Part of Practitioners.

The number of members of our profession in this country who make use of drugs in an irrational way is surprisingly large. In ancient times therapy was empirical because the ætiology and pathology of disease were not thoroughly understood, and our diagnostic methods were limited to our senses, e.g., percussion, auscultation, etc. During the last thirty years a remarkable advance has been made in these branches and drug therapy of to-day is likewise emerging from empiricism so as to be based on clearer conceptions of physiology, ætiology, and pathogenesis. Unfortunately the non-critical and indiscriminate use of drugs is prevalent in spite of this advance in our knowledge. One has only to look at most of the prescriptions written by practitioners in India to see the true state of affairs. There is a great temptation to prescribe 'shot-gun' prescriptions, as well as to advise the use of all kinds of novelties, introduced from time to time and which survive for a year or two in the drug market. Proprietary medicines, the composition of which is not known, are commonly prescribed, and different kinds of patent foods are advised, when simpler remedies would be of equal value. Many kinds of digestive ferments and glandular products are included in prescriptions and they are frequently inactive, especially in India where their proteins are so readily liable to decomposition. Vaccines and serums are injected, without due regard to their utility in the conditions under treatment. Amongst the lay public there is a craze for the administration of drugs by the intravenous or intramuscular routes, and the idea seems to have gained ground among medical men that drugs are only effective when given in this manner. Then again any drug advertised in a medical journal is considered to be useful if it is backed by testimonials. It does not seem to be realised that in addition to a large number of useful and potent drugs on the market there must be a host of others of doubtful value. Every mail from Europe brings to the practitioner in this country a number of new drugs for which the chief evidence of efficiency depends upon their trial on a few cases of a particular disease treated mostly by individuals who are not trained investigators. The majority of these so-called remedies have a very short life but during this period they often enjoy a rich harvest of patronage. They are, however, useless, and practitioners frequently try them on many of their patients without doing the least good.

Too much drugging.—There is also a tendency among practitioners to overdose their patients with drugs, and an enormous amount of money is wasted on medicines. Cases of such fevers as enteric and many other conditions for which no specific medicinal treatment exists are dosed with all sorts of complicated mixtures, when attention to diet and other forms of general treatment such as proper nursing and care of the sick and convalescent would do more good than all the drugs in the *Pharmacopœia* put together. The public in this country, more than anywhere else, have a child-like faith in medicines to cure all their ills, and judge the efficacy of a treatment from the number of medicines prescribed. Medical practitioners are often too complacent in satisfying this desire and sometimes even encourage it. When I have seen a patient and only prescribed general dietetic treatment and nursing I have often been asked "Is not the patient going to have any medicine?"

It will not be inopportune to consider the causes of this irrationalism on the part of practitioners. For only in such wise may one plan to mitigate, if not altogether to eradicate, the evil.

Medical Education in India.

The first and foremost cause of the present low status of medicine in India is the defective education in medicine generally and in pharmacology particularly, which is given to the student in this country. Two grades of medical practitioners are trained; a superior grade whose education comes to nearly the same standard as that of the students in England and America, and an

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inferior grade (sub-assistant surgeons), who have a shorter training. The pre-medical education of both these grades is very poor. Abraham Flexner in his book on medical education says that the medical student both in America and England is poorly educated. This applies with even greater force to the student in India. In the one or two years preceding medical studies too much attention is paid to the scientific subjects, with the result that general education in subjects such as logic, sociology, psychology, history, economics, English literature, and rhetoric is neglected. The majority of the medical students in consequence are lacking in the broad outlook given by general education and the knowledge of the forces governing human interests and behaviour. Instruction in other languages such as German and French in which a large amount of scientific literature exists is not given in most colleges.

There are eight medical colleges in India turning out on an average 800 medical practitioners every year, but there are also a large number of medical schools which train many thousands of practitioners. The education of this latter class is of a lower standard and does not entitle them to registration in the United Kingdom. This kind of education is on the increase, owing to the economic conditions prevailing in the country, but the demand is incessant and so a further number of schools are being opened everywhere by private and public enterprise. In Bengal an attempt is being made and proposals have already been put forward to have a medical school in each district. A few of the institutions in the central provincial towns are well equipped and well conducted, but most of them are poorly equipped, badly staffed, and entirely unsuited to train a good class of practitioners. The result is that many of the general practitioners in India have a poor medical training. Even in the medical colleges, though the education is of a higher order, it is not entirely satisfactory. The system of imparting education is faulty. The method of selection of teachers and professors is such that most of these coveted appointments often do not go to the best available men. The provincialisation of the medical services has only made this state of affairs much worse, so far as the service men are concerned. In the old days the choice could be made from the services all over India for a chair in a particular subject, whereas now the selection is confined to a small cadre serving in the particular province in which the institution is situated. Further, there is little or no leave reserve for these particular appointments, and when an incumbent proceeds on leave the nearest available man is put in to officiate irrespective of his qualifications. The result is that at one time a teacher may be giving instruction in anatomy, at another he may find himself professor of pathology and bacteriology, and shortly after he may be installed perhaps as ophthalmologist, to be followed by his officiating in a chair of gynæcology and obstetrics. In this way it is not unusual to find a class of "universal professors" and the instruction of the students suffers for obvious reasons.

Medical Curriculum.—The medical curriculum in this country, both in the schools and the colleges, is far from being satisfactory. In countries like England and America and many European countries the curriculum has been recently overhauled and many reforms have been introduced to make it as practical as possible. The General Medical Council have carefully considered the question and Sir George Newman in his memorandum has examined every aspect of this important problem and has suggested useful improvements. The medical curriculum of to-day in India is wasteful in its method of teaching and is full of detail of all sorts representing "the conceptions of half a century ago with certain laboratory procedures superimposed." The course is overcrowded and an attempt is often made to impart to the student a lot of antiquated knowledge from text-books to the detriment of the general principles of the subject so that he only gets a very superficial knowledge. Great importance is attached to lectures and the student spends a great part of his time listening to them. Lectures based on actual experience are worth hearing, while others read from text-books can be more easily read by the student himself. Swale Vincent said that lectures are survivals from days when there were no text-books. But in India there is a scarcity of suitable text-books. In fact many of the lecturers in this country use unsuitable text-books for their lectures, which does not enhance the value of their teaching. Others give intricate dissertations, whereas they ought to present clearly and concisely the subject in hand, keeping in mind the level of the student's intelligence, many of whom can absorb only a little at a time. The great mass of theory and knowledge should be presented to the students in a carefully prepared systematic and concise form so as to enable them to grasp the essential facts and understand how to utilise the details.

Practical instruction also needs a great deal of improvement. A lot of unimportant detail is taught which is of no use to the general practitioner. Improvement in the method of instruction will result in the students learning more in a shorter time. This can only be attained by industrious work and devotion of a lot of time on the part of the instructor, and it must be done if the students are to be instructed properly. Unfortunately under the present system of medical instruction in this country this does not appear to be possible. Most of the teachers in the colleges are engaged in private practice to which they devote most of their time, and consequently the majority of them cannot give sufficient time to the proper teaching of their subject. In America whole-time professors are often employed and this is also the case with countries like Germany. In England the advantages of this system have only recently been appreciated and it has been introduced in some medical schools. The advantage of this system is that professors and teachers have not to earn a part or the whole of their livelihood by seeing patients. They are, therefore, free from the anxieties of practice and can devote themselves entirely to their subject and come into closer contact with their students. In India at present, the teachers and the students live in two entirely different worlds. The teachers have not the time to know their students, and further, owing to the large numbers that they have to teach in their classes, it is impossible for them to come into personal contact with any but the most brilliant. Furthermore, if the lecturers had more time at their disposal they could devote themselves to scientific research in their subject. The great progress made in scientific medicine in countries like America and Germany is mainly due to this scheme, and if it could be instituted in all the teaching institutions in this country the stigma that India's contribution to medical research is small would soon be removed. The teachers should be well qualified and should be given a living wage suited to their position. The idea that good men will not be forthcoming to take up these appointments under such conditions is not correct. There are many excellent men who prefer a life of study and scientific research to a life of gain, and who would be admirably suited for the posts of professors and teachers. In suggesting the introduction of whole-time professors I am fully conscious of the disadvantages of this system. Many diseases and symptoms met with in private practice are hardly ever seen in hospital practice. It has also been pointed out that the teachers learn the needs of the general practitioner as regards extension of his knowledge, etc., by being in touch with that class of practice. This object could, however, be attained by throwing open some of the clinical appointments to distinguished practitioners or by restricting the private practice to limited consultant practice in the case of a few of the senior members of the hospital staff.

Pharmacology, the science of the action of drugs, has practically no place either in the curriculum of the medical schools or of the colleges in this country. We still carry on with the old fashioned "Materia Medica" in the true sense of the word. The General Medical Council of Great Britain has laid stress on the proper teaching of this subject, and yet in very few of the medical schools and

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colleges in India are there proper arrangements for giving practical demonstration and instruction to the students in practical pharmacology. The little instruction that is given on the theoretical side is imparted during the second and third years when the student's mind is not properly ready with the basic facts of anatomy and physiology. He is taught the therapeutic use of drugs when he does not know even the names of the diseases, much less their symptomatology, ætiology, and pathogenesis. The action of drugs on tissues, which forms the foundation of treatment of disease, is considered so unimportant that any medical man without any technical knowledge is considered proficient to teach it. The importance of proper teaching of this subject cannot be over-rated. Professor W. E. Dixon a few years ago said, "To state that the future of medicine lies in pharmacology may sound fanciful, but it is certain that the most hopeful of all signs of progress of medicine of to-day is to be found in the progress of the science of treatment." Though diagnosis is of prime importance, the patient is less interested in it than in the treatment of his disease, and pharmacology forms the basis of treatment. It tries to localize the seat of action of drugs, the mechanism of their action, and gives information about the nature of physiologic and pathologic processes. It deals with the changes produced by chemicals and physio-chemical agents, not only in healthy tissues but also in diseased ones. It is not merely a question of transferring results from isolated pieces of intestine or the uterus of animals to human beings, as is imagined by some. Circumscribed syndromes can be produced in experimental animals and the effect of therapeutic measures can be tried on them. In this way new drugs and chemicals can be thoroughly tested, not only in healthy animals but also in those in which special diseases have been induced, before they are tried on human beings. Laboratory pharmacology is the basis of research into practical therapeutics. It is responsible for the introduction of many useful compounds of arsenic, antimony, and bismuth into therapeutics. It is clearing away antiquated methods and remedies and is purifying those that remain. A sound training in pharmacology alone can make drug therapy more rational. The teaching of pharmacology in India should be improved and remodelled, and the sooner it is done the better. Only by this method is it possible to exclude the empiricism that surrounds our art. The irrational tendencies among medical practitioners are bound to go on until the teaching of pharmacology is put on a sound basis in this country. Trained pharmacologists, however, in the Indian teaching institutions are at present mainly limited to the Calcutta School of Tropical Medicine, but we are training experimental pharmacologists for various provincial governments.

The teaching of tropical medicine.—Lastly, the student is given inadequate instruction in the treatment of the diseases peculiar to the tropical and sub-tropical climates of this country. It is admitted that strictly speaking there are remarkably few tropical diseases. Most of the great scourges met with in the tropics occur in temperate climates also, and many of the dangerous diseases of temperate climates are met with in the tropics in altered forms. A study of the effects of climate, tropical sanitation and hygiene, has however a very important bearing on the understanding of disease, as met with in this country. These diseases are totally different from those described in European text-books. It is important, therefore, to emphasize tropical medicine in the curriculum of our colleges, and arrangements should be made for instruction in this subject to be fitted into our undergraduate course of studies.

Advertisement and New Drugs.

The second factor responsible for irrational drug therapy is the publicity which is given to drugs through notices in the medical and the lay press and by means of circulars broadcasted to the members of the profession. There are many manufacturing drug houses in Europe and America which prepare a large number of products and introduce them to the profession. They make sweeping claims regarding their therapeutic value, without producing very satisfactory evidence in support of their contentions. Some of these advertisements do considerable harm and they even persuade people that in order to keep well they must constantly dose themselves with the drug. They certainly encourage long distance diagnosis and treatment, and lead to the postponement of the application of proper treatment, sometimes with very bad results. The loss of time resulting from the use of ineffectual symptomatic remedies is a serious matter and there is also a great danger of drug addiction.

Professor Clark in a paper entitled "Commercial Influences in Therapeutics" very ably and forcibly brought these facts to the notice of the profession in England. He said that in that country—and the same law applies to India—there were no safeguards in the claims made for patent and proprietary medicines in advertisements which were demonstrably false. For all practical purposes the British law is powerless to prevent any person from procuring any drug or making a mixture whether potent or without any therapeutic activity whatever, so long as it does not contain a scheduled poison. He can advertise it in any terms as a cure for any disease or ailment, and recommend it by bogus testimonials under facsimile signatures of fictitious physicians, and sell it under any name he chooses on the payment of a small stamp duty, for whatever price he can persuade the public to pay for it. The therapeutic promoters occupy a position of great power. They control the lay press on account of their advertising capacity, and through it Parliament; they exercise a considerable influence over the medical press also.

In America the legislation for controlling proprietary and other drugs is very effective and the provisions of the 'Food and Drugs Act' are very comprehensive. This law lays down that in case of proprietary medicines labels or packages should not contain any statements of therapeutic or curative effects of drugs which are false or fraudulent. The use of the word 'cure or remedy' should be used only for those medicines which are 'cures or remedies' for the conditions named on the label. The placing on the label of the names of diseases is taken to imply that the medicine contained in the package is in itself a treatment for the diseases or the conditions named. This has led to the exclusion of these terms and the substitution of such expressions as 'will often relieve' or 'will aid Nature to restore,' etc. People who use these remedies on the strength of no stronger evidence than these weak assertions only have themselves to blame for the results. It is surprising, however, that even these vague and non-committal advertisements in the medical journals succeed in impressing the medical man. One reason is that on account of his genuine modesty the medical practitioner is prone to receive with undue respect any kind of plausible nonsense which appears to be scientific, and the therapeutic speculators who introduce new drugs get at the medical profession in this way. This is especially the case with biological products, which are now much in vogue. The field here is new, the mode of action of these substances is not thoroughly understood, and few general practitioners are well informed concerning them. Besides this, remarkable results sometimes follow their use which impress physicians and encourage their indiscriminate use in all sorts of conditions.

In America, the Council of Pharmacy of the American Medical Association, is serving a very useful purpose in bringing before the profession the truth concerning new proprietary preparations. This Council consists of reputed clinicians, pharmacologists, and chemists, and has a well equipped chemical laboratory. It investigates all the new preparations put on the market and carries on propaganda for the rational use of drugs. Those remedies which give promise of being more or less of value in the practice of medicine are put into its annual publication called the 'New and Non-official Remedies' or as it is briefly called 'N.N.R.' Those which are not approved by the council are dishonest or worthless preparations. Those remedies which are included in the

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N.N.R. to begin with and which are subsequently found to be useless are excluded from later editions.

New Drugs and Old.

Most new drugs are introduced into medical practice either through the agency of scientific investigation or through commerce. When they come through science, exaggerated claims as a rule are not made regarding their therapeutic value. When they come through commerce, financial considerations unfortunately often dominate the situation and exaggerated claims are not infrequently made to create a demand for them among the medical profession. The advertisements are often couched in scientific or pseudo-scientific language to impress practitioners. Commercial advertising for this reason is often misleading, though it must be admitted that many of the good class drug houses employ men with high scientific attainments, and advertise and place only such products on the market as have been properly tested. A really good drug wants no advertisement. In a very short time the most laggard of practitioners will start using it, not only for the disease in which it is efficacious but also in many other conditions in the hope that it may do good. Emetine is not only used as a cure for amœbic dysentery but is also used in the bacillary form and in many other conditions. The organic arsenicals and organic compounds of antimony are being tried in all kinds of diseases. A great many novelties however are being brought out which are not sufficiently tried. This tendency of modern medicine towards too readily accepting new remedies is to be greatly deplored. As soon as a new remedy is put on the market, practitioners hasten to prescribe it. They feel no reluctance to try new things, even though their minds are not properly acquainted with the use of old and well tried remedies whose actions are established and which are known to be of value in the treatment of diseases. They do not realize that new drugs and new methods of treatment require a long and serious study by able and experienced investigators before their beneficial effects can be established and their harmful effects discovered by treating many cases, before they can be introduced into therapeutics. The disadvantage of using new remedies is that the confidence in the old and beneficial remedies is lost. New drugs should never be allowed to come into use unless they are of unquestionable value. In the public interest they should go through proper preliminary experimentation, with adequate controls. Sir William Osler talking about the danger of new drugs and about falling under the claims of pseudo-science and commercialised empiricism, said "Give our students a first hand acquaintance with disease and give them a thorough practical knowledge of the great drugs, and we will send out independent clear headed cautious practitioners who will do their own thinking and be no longer at the mercy of meretricious literature, which has sapped our independence." It is because of his faulty training that the practitioner makes use of these old-established drugs in a perfunctory manner. Not understanding fully the action of well known and recognized remedies, and not knowing how to combine them for the treatment of disease, he takes the easiest way out and prescribes ready-made products whose action and indications for use are all made available to him by drug circulars. Proper instruction of the student is the most effective weapon against the evil of falling into the hands of therapeutic speculators. The intelligent selection and proper administration of therapeutic remedies depend essentially upon skilled teaching. Drugs should be given with an object, and it is the duty of the physician to verify at each stage whether this object is gained or not. If treatment is conducted in the same way as scientific investigation, irrationalism will disappear from our therapy.

Control of Therapeutic Agents in the Market.

It frequently happens that a practitioner seeks the new drugs because he has lost confidence in the old ones. This is due to the fact that a large number of drugs which appear for sale on the market in this country have not always the therapeutic activity which they are alleged to have. The factor of climate is of great importance; the high atmospheric temperature combined with a high degree of humidity produce deterioration of drugs during storage. For the last few years I have been engaged in examining by chemical and biological assay many preparations of potent drugs on the market, both those manufactured by the drug houses in India, and those imported into India.

(1) Those manufactured in this country are subjected to no control whatever by the State to see that the quality of the preparations is up to the standard laid down in the pharmacopœia. I have tested a number of such preparations and have found them to vary a great deal in their strength. In some cases the preparations came up to the prescribed standard, but very often they were below the average, and sometimes quite inert and therefore useless for therapeutic purposes. This is specially the case with preparations made from such drugs as digitalis, strophanthus, squills, ergot, cannabis indica, etc. These preparations, which can only be assayed by biological methods, are put on the market without their potency ever having been tested.

There is no law to prevent this. There is, so far as I know, only one firm of manufacturing chemists in India who get their products biologically assayed before putting them on the market. The shortcomings of biological assay are admitted, and we know that it is only accurate within 20 per cent. and the margin of error is wide. But from the point of view of the practitioner some form of standardization is necessary for all potent drugs, and more particularly for those drugs of which the active principles cannot be isolated, because it is especially in these that there is danger of obtaining inactive products. Not only are galenicals and other pharmacopœal preparations manufactured by Indian firms, but attempts are being made to prepare some of the biological products such as gland extracts, vaccines and serums, and some of these have been put on the market. Besides these, a number of potent organic compounds of antimony have been introduced by some manufacturing firms in Calcutta and are being largely given intravenously by practitioners. No control whatever is exercised by the State over these potent compounds with a view to see that different batches of these manufactured products are chemically the same and that their toxicity has not varied. In the case of all organic arsenical and antimonial preparations introduced into therapeutics in America and the European countries a strict and severe test is enforced.

(2) With regard to the imported drugs, which form by far the largest proportion of drugs used in India, most of them are manufactured by reputed firms who employ a competent staff of chemists and pharmacologists to standardise them. The climatic conditions however in this country have to be taken into consideration. A few years ago my laboratory tested nearly a hundred preparations of digitalis made by reputed firms and found that most of these had deteriorated to the extent of 30 to 40 per cent. within a few months of their arrival in India. Some drugs such as thyroid extract, adrenalin, pituitrin, etc., are similarly affected. Several batches of old tablets of pituitrin and adrenalin and some containing potent alkaloids which we tested had appreciably deteriorated in quality. The keeping properties of organic arsenicals and a number of other potent remedies when exposed to tropical climates, still remain to be worked out. Control of these products on the market is therefore of prime importance.

Therapeutic Substances Act for India.

In the United States of America the Government controls the remedial agents by means of an inter-state commerce clause of the constitution. Under this Act the "Food and Drugs Act" is enforced by the Bureau of Chemistry of the Department of Agriculture, while the sale of biological products such as serums, vaccines, etc, is controlled by the Public Health Service. Not only is control exercised over all drugs, serums, etc., that are meant for home consumption, but all substances belonging to this class which are imported or exported are also governed by the Act. The Act is designed to secure

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truthful names and reliable statements for all the remedial agents and is divided into two parts.

Part 1 of the Act is concerned principally with preparations primarily designed for the use of the laity direct, and Part II applies to medicines ordinarily prescribed by physicians. This Act ensures that the purchaser, whether a physician or a layman, secures an honest product. It means that pharmacopœal preparations must come up to the standards laid down in the *United States Pharmacopœia*, failing which the manufacturers will be prosecuted. In the case of patent medicines the law requires that only those claims should be made which can be substantiated, and in this way it controls exaggerated claims and misleading and false advertisements. Standards are provided for most of the biological products. In the case of preparations for which tests of standards are incomplete, the samples are sent to the Government Laboratory with a copy of the record of the maker's tests and these are repeated and the preparations are finally passed for sale or rejected. The toxicity of each batch of organic arsenical products is tested before it is allowed to be sold. No license is granted to any firm until the licensing authority is satisfied that the personnel and equipment of the firm is qualitatively and quantitatively efficient for the purpose for which the license is sought. In addition to this licensing system, samples of finished products are bought in the open market and are tested by officers of the Government with regard to their purity and potency. By these activities a constant control is kept over these drugs, and the postal authorities are responsible for the prevention of frauds and exploitation through the post. In England the 'Therapeutic Substances Act'—corresponding to the American Food and Drugs Act'—was introduced only recently, but its terms are not so comprehensive. This Act controls the quality and authenticity of such therapeutic substances as cannot be tested adequately by direct chemical methods. These are divided into three groups. *Group I* consists of biological products, such as vaccines, toxins, and antiserums. *Group II* includes substances such as organic arsenicals and antimonials. *Group III* is formed of insulin and other gland products. The manufacture of these substances is carried out by properly licensed firms who conform to the standard of strength and purity laid down by an appointed committee.

In India there are no safeguards whatsoever against manufacturing, advertising, and selling to the public therapeutic products of any kind, whether potent or inert, effective or ineffective. The result is that a large number of medicines, both proprietary and otherwise, which are presented for sale in the market, fall far below the standard. Lately a good deal of interest has been taken in this subject and in a lecture to the Rotary Club at Calcutta the subject was brought up for discussion. The speaker suggested that legislation on the lines of the British Food and Drugs Act should be passed in India as a means of protection against the indigenous production of patent and other medicines. At present, while in other countries regulations regarding the preparation and sale of medicines are very strict, no standard whatever of any kind is imposed in India. Many manufacturers in this country produce articles which have only a slight resemblance to the standard or genuine articles, and therefore firms anxious to produce only reputable goods cannot compete with them. The excise authorities instituted an enquiry into the causes of falling off of sale of rectified spirits, and found that in many cases alcohol was not being used in the quantities necessary to produce the standard articles. The medicinal or therapeutic value of the preparations may be negligible and the consumer has no guarantee that the standard of activity is being maintained. Large quantities of medicines are sold in tablet form, offering an excellent opportunity for deception, and an example was given wherein 5-grain tablets of quinine consisted of only one grain of quinine and four grains of starch or other inert matter. Essential oils such as sandal wood oil, cinnamon oil, etc., and preparations such as vinum ipecacuanhæ have many inferior substitutes on the market.

Such being the case, is it at all surprising that the profession should lose confidence in these remedies? And it is this want of confidence which leads the physician to try anything new that reaches him by means of advertisement and drug circulars. The question of protection from these medicinal frauds touches not only the physicians but the whole of the public, and an Act on the lines of the British Act, or better still on the lines of the American Act, is the only possible remedy.

Control of Dangerous and Narcotic Drugs.

In many civilised countries dangerous drugs, including narcotic drugs, are controlled by the State. In Great Britain recently as the result of an enquiry by a Committee, regulations concerning the manufacture, sale, and even professional use of narcotic drugs have been extended and re-enforced, and many drugs such as barbituric acid derivatives like veronal have been included in the schedule. Addiction to such drugs as morphine and heroin, according to this Committee, is rare in England now owing to enforcement of the Dangerous Drugs Act which makes it very difficult for the addicts to get these drugs except through a medical practitioner. In India there is little or no control over the sale of these drugs. Though drugs like morphine and cocaine are not supplied except by a prescription from a physician, opium and cannabis indica are sold to any one who goes to the shops licensed by the State, and addiction to these drugs has increased during the last decade. Large quantities of cocaine are also smuggled into the country and this most vicious of all drug habits is prevalent among a certain class of the population in India. Recently some interest has been taken in the problem of the opium habit by public bodies such as the Indian National Congress, and the Government has been urged to control the production and sale of opium. The sale of all narcotic drugs needs to be brought under more strict control. In countries like America drug addicts are registered and are regarded as wilfully vicious individuals; they are notified to the authorities before drugs can be supplied to them. Legislation on similar lines which would not only make it very difficult for the general public to buy these drugs but would also brand the addict with a stigma is the only means to prevent the spread of drug habits.

Need for Central Organisation. Therapeutic Research.

The control of therapeutic remedies on the market can be properly effected only if there is a central organisation, similar to that existing in the United States or like the Medical Research Council in England. Things are so complicated and specialised nowadays that the investigation of details is beyond the power of any one individual. The chemists, the pharmacologists, the physiologists, and the biochemists must work in co-operation with each other and should have all the facilities necessary for their work. This can only be effectually done if there is a central organisation under the control of the State, capable of testing substances from every point of view. This central organisation will not only help in the control of the therapeutic agents on the market, but having competent men representing all branches of medicine on its staff, it will conduct therapeutic and other researches on the important problems which are peculiar to India. It should be situated in a large centre where ample clinical material is available. The central organisation could have ramifications spread all over the country, so that problems peculiar to different parts of the country could be dealt with efficiently. Our problems are numerous, immense, and unworked, and if such an organisation comes into existence a tremendous impetus would be given to medical research in this country. It is about time that a beginning on some such lines was made. Until quite recently the idea of medical research in this country was mainly confined to bacteriology and to the closely allied branches of medicine; in fact the Medical Research Department under the Government of India was known by the name of the Bacteriological Department, and most of the appointments under it even now are filled by bacteriologists, protozoologists, and entomologists. Research should be

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looked upon from a much broader point of view. We should have research workers in all branches of medicine in order to examine every aspect of our medical problems. The importance of medical research does not appear to be sufficiently appreciated by the public in India. It is not realized that the foundations of medicine and its application are based on research, and that the protection and advancement of research is the primary duty of the State. Sir Ronald Ross in a lecture recently said that to human beings medical discovery was the most important of all kinds of discovery and the amount of public attention given to it was disproportionately small. He said that in England the total amount provided for medical research worked out at about one penny per head of population per year, and tremendous results were expected by the public for this small expenditure. The contribution of the State towards medical research in India is very small indeed considering its size and its population. Medical research has suffered for want of means. It requires expensive laboratories, costly apparatus, and a staff of competent workers who have to be well paid, but the statesmen who are responsible for the public purse somehow seem to be reluctant to spend money on it. The short-sightedness of this policy has at last been realized in England. During the last few years, the United Kingdom has been spending £140,000 a year on medical research, and the immense value of the work done and the benefits which the public have received from it are now being appreciated. The future of medicine in India depends on ample provision being made for the vigorous prosecution of research. Its benefits will soon be appreciated. State recognition of research will also stimulate voluntary endowment. On this also depends the improvement of medical education and the turning out of a good type of practitioner. The spirit of research should be inculcated in all the teaching institutions, as there is no doubt that the best teaching can only be carried out in an atmosphere of research, and the best students can be turned out only by men engaged in research work. Research and teaching are intimately connected.

The advantages of such an organisation would be very great indeed and the resulting economic gain to the country would be enormous. There is a large number of problems which challenge the medical research worker and which might be worked out to the great advantage of the people. The standardization of treatment with such remedies as quinine, emetine, antimony, and arsenic compounds, etc., for diseases prevalent here will not only be of importance from a medical but also from the economic point of view. If maximum and minimum effective doses of such drugs, and maximum and minimum periods of their administration are worked out by a properly constituted body of experts a lot of waste could be avoided in the use of these drugs. The saving effected would more than pay for the cost of upkeep of such an institution. Even for such a prevalent disease as malaria no standard treatment has so far been worked out, and the amount of the expensive cinchona alkaloids which are wasted on account of the great disparity of doses is enormous. Major Sinton's work in this connection is most valuable, but being single-handed he can only investigate one aspect of the problem at a time. Here is a field of medical research where co-operation might considerably facilitate a most useful inquiry. The State alone could give facilities for work with an ideal population under control such as the army, and non-infective sites such as hill stations where experiments could be properly conducted. I do not wish to go into details of the many important problems peculiar to India which remain unsolved, but I think that it may not be out of place to mention some of them to show their importance.

Filariasis is prevalent, not only along the sea coast but some hundreds of miles inland. Although a complete survey has not been made for the whole of India, the work done at the Calcutta School of Tropical Medicine shows that in eight districts in Bengal the population is affected to the extent of 4 to 16 per cent; in Behar, Orissa, and Chota Nagpur the figures are much higher, going up to 27 per cent. Most of the sea coast districts of Madras and Malabar are heavily infected. A large portion of the population of these areas is incapacitated from this disease every year. Yet a perusal of the literature on the subject shows that very little work has been systematically undertaken to find out an effective treatment for this disease. Another allied disease which is also responsible for a lot of incapacity in Central India and Rajputana is *dracontiasis* or guinea-worm infection. We are still where we were half a century ago regarding its treatment, and with the exception of the work done by Dr. Hamilton Fairley the problem has not been worked out. A disease of great importance is *kala-azar*, which has been, and is still taking a very heavy toll from the inhabitants of Assam and Bengal. This is one of the few Indian diseases on which systematic work has been undertaken, and it affords an example of what can be done by properly conducted research work. During the last decade the mortality rate of 90 per cent. caused by this disease has been changed into a cure rate of 90 per cent. by the development of its treatment with pentavalent compounds of antimony. Many questions, however, in connection with its transmission, prevention, etc., still remain unsolved.

Ringworm is one of the most widely prevalent of skin diseases in all parts of India and it is responsible for a lot of incapacity. Major Acton, during the past year, has been engaged in the differentiation of its species and the recognition of the pathological lesions produced in man by this disease, but with this exception no attention has been paid to this important source of incapacity. A pest which regularly visits Bengal every year about the end of the rainy season and of which we have had a big outbreak last year is epidemic dropsy. It is responsible for much incapacity and has a fairly high rate of mortality, but we are still not quite clear about its ætiology, pathogenesis, and treatment, though the investigations made in connection with it at the Calcutta School of Tropical Medicine during the last few years have thrown a good deal of light on it. A group of conditions including infective conjunctivitis, infective granulomata, and tropical ulcers, though not serious to life, are responsible for much disability and do considerable harm to the population; they form a practically unexplored field. Pernicious anæmia of pregnancy, osteomalacia, and infantile cirrhosis are common in some of the large towns of India. Dengue and a number of fevers of short duration are prevalent, but their ætiology is not solved. The post-dysenteric conditions such as asthenic diarrhœa, chronic peritonitis, and cirrhosis of the liver are prevalent but we have little knowledge concerning their pathogenesis or treatment. Tuberculosis is spreading in many parts of India and so far nothing has been done to find out the reason for this increase and the measures which can be taken to prevent it. Drug addiction has also increased since the war.

Training of Research Workers.

Such are some of the problems peculiar to our country that can be tackled by experts at a central institution or in the areas affected by the diseases concerned. Such a body alone can make concentrated efforts and attack them from every point of view. Considering the immensity and importance of these problems to the welfare of the people, it is obvious that the State would be quite justified in spending money to give facilities for their investigation. The first great need is for a fully staffed and thorough equipped central institution in which workers can be trained and from which investigators can be sent out to investigate diseases in the places where they occur. In addition to this the local governments should be encouraged to provide research laboratories for work on the special diseases of each province. Medical research to-day is not a single-man show; at every stage one needs the valuable assistance of colleagues of real worth. Without their co-operation, progress is bound to be small. Unfortunately we have at present very few such trained workers available in India, either in the services or outside, for the simple reason that there is no proper

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training ground for them. There are a number of enthusiastic young men educated in the Indian as well as the British and American universities who take a keen interest in this kind of work, but they cannot take it up for lack of opportunities. It is essential that provision be made for the training of young workers and for ensuring a prospect of a decent livelihood for them in research. The result of the present state of affairs is that when a new line of research is to be started there is very great difficulty in finding suitable men for it and a worker from outside has to be imported on a very high salary. As often as not funds do not permit of this, and the work is dropped entirely. The central institution could serve as a training ground for research workers. One of the duties of the experts on its staff should be to train suitable young men for research in different branches of medicine so that they would be available for work on different problems.

Medical, Veterinary, and Allied Sciences.

And last but not the least, I would like to bring to your notice the necessity for closer co-operation with the sister science of veterinary medicine and with such allied sciences as zoology and botany. The problems of the veterinarians are much the same as ours, and zoologists and botanists can render us considerable help in connection with the transmission and spread of disease and its pathogenesis. For nearly thirty-five years Clifford Allbut advocated the importance of the study of comparative medicine. His ambition was to found a school of research in animal and plant pathology in Cambridge. A chair of animal pathology was established a few years ago, and the beginning of a great school of comparative medicine and pathology has already been made in that university. The tendency of the medical and veterinary professions to work in water-tight compartments is to be greatly deplored. Co-operation between the two professions can be of immense use in working out some of the obscure problems with which we are confronted in India. A section of comparative medicine was started a couple of years ago in connection with the Royal Society of Medicine, and Mr. Frederic Hobday in his presidential address said "The foundation of our present position in the administration of anæsthetics, the splendid safety of our present day surgery, the study of therapeutics and pathology, even medicine itself, all had the principal part of their pioneer work done upon animal patients, before being applied to the human being." Those engaged in resarch work can fully appreciate the significance of the remark. In our every day experimental work on animals many points arise in which veterinarians could help us with their knowledge of animal anatomy, physiology, pathology, etc., to correctly interpret our observations and apply them to the service of man. Medical men and veterinarians are alike intimately concerned in pathogenic bacteria and protozoa, and there are many diseases in this country common to both men and animals. Rabies, Malta fever, anthrax, intestinal parasites, rinderpest, bovine tuberculosis, etc., and many skin diseases are transmissible from animals to man. A combined investigation of such problems would be of very great value to both and would not only help to alleviate the suffering of humanity but would also benefit the animal wealth and agricultural resources of this country.

I may urge in conclusion that my plea for a central research institution does not proceed from any class or service motives. I regard research in medicine as of prime importance, and for such research to be effective co-ordination and co-operation are essential. Such a growth cannot be achieved by private or individual effort; the collective resources of the nation must pull together to attain the desired harmony and progress. I have pleaded for State help, for I consider that in a vast country like ours, where perhaps socialised institutions are the only effective agencies, a problem of such magnitude and importance cannot otherwise be solved. A State exists for the good of the people, and what greater service is there than a growth in the health and vigour of the races concerned?

"HE CEASED TO BE A DOCTOR"

By W. H. OGILVIE, C.B., C.M.G., M.B.,
MAJOR-GENERAL, I.M.S.,
Director of Medical Services, India.

I HAVE lately been in conversation with one or two officers of the I.M.S. occupying important executive appointments on the civil side of the Service. They were well versed in the curative side of the profession and one at least had seen a good deal of active service during the great war and had served in it with credit. The course of conversation led them on to express regrets at the waste of their curative talents during the war; to estimate the worth of all officers of the medical services almost entirely by their skill in curative treatment; and to the statement that the majority of officers of the Medical Services in military administrative employ had "ceased to be doctors."

I had thought that this view of the position of the science and art of medicine in relation to the Army had disappeared after the war. The knowledge that it still exists is a cause of somewhat bitter reflection on the misapprehension of the rôle of military medical officers. While acknowledging the possible accuracy of "Qui s'excuse s'accuse" I feel it incumbent on me to lay before my brother officers another aspect of the question.

A good statement of some of the points will be found in *The Journal of the Royal Army Medical Corps,* Vol. XLIV, No. 4, for April 1925, in an article by Major H. S. Blackmore, O.B.E., R.A.M.C., entitled "Overcome soldiers accustomed only to the usages of the past." This publication is possibly not seen by some I.M.S. officers, and in any case the apologia here set forth runs on lines not identical with those of the article referred to. One of the reasons for referring to the article is the idea contained in it of grouping all the activities of preventive medicine, surgery, curative medicine, and all cognate arts and sciences under the heading "Health Services." In spite of any academic criticism of the words they remain a convenient formula for expressing the idea of preventing ill-health and of restoring health when lost by any cause whatsoever—disease or accident. This expression is therefore used in this article with this meaning.

The point of view now combated is founded on the narrow conception that a "doctor" is one concerned only with the comfort and cure of the individual patient. The function of one trained in Health Service who joins the Army is that of a medical soldier, and consists in helping to "win the war." He does this by:—

(1) Preventing as far as possible inefficiency due to preventable causes.

(2) Lessening unpreventable inefficiency by the collection, removal and treatment of casualties due to battle and disease.

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He effects this purpose by:

(1) A knowledge of tactics. By this he can appreciate the military problem and can make the best use of the "Medical Arm" to contribute to the success of the Commander's plan.

(2) A knowledge of military organisation and administration whereby he can make the best use of all the means at the disposal of the "Medical Arm."

A knowledge of tactics and organisation when applied to health matters is obviously of little use without a knowledge of the science of health. Therefore the "Medical Arm" can only be run by those acquainted with this science, i.e., the medical profession. Conversely, those of the medical profession who serve in the Army can only achieve their end by a study of tactics and organisation, thereby becoming medical soldiers.

This view can be illustrated by imagining the alternatives:—One is the placing and moving about in the war zone of civilian practitioners ignorant of tactics and military organisation, and dependent for these on attached officers of half a dozen branches of the army—General Staff, "A," "Q," S. & T., Ordnance and Veterinary.

The other is the establishment of a Service trained in health, tactics and organisation, and which can apply a knowledge of health to military problems.

The first alternative is on the face of it unworkable and has been proved so by experience in the past. The second has proved its worth whenever tried, and never more so than in the great war. The deduction seems inevitable that "the Medical Arm" of the fighting services can only work satisfactorily if the individuals composing it have a thorough knowledge of the science of health—both preventative and curative. The fact that this knowledge is applied to a special end cannot justify the opinion that it does not exist.

Has the medical soldier really "ceased to be a doctor"?

THE INTERCHANGE OF HEALTH PERSONNEL IN JAPAN UNDER THE AUSPICES OF THE LEAGUE OF NATIONS.

A Report by F. P. MACKIE, O.B.E.,
LIEUTENANT-COLONEL, I.M.S.,
(*Calcutta. Government of India, Central Publication Branch*, 1926).

(THIS report on Japanese hospitals is of great interest, giving as it does the impressions formed by an expert who has an intimate knowledge of European and Indian hospitals. We give a few extracts which will enable our readers to form an idea of the conditions which prevail in Japan.)

The Japanese Red Cross Hospital in Tokyo.—Is primarily intended for soldiers and sailors in war time but during peace time it is used largely as a civilian hospital.

It is largely used as a training ground for relief personnel and also for nurses both for work in the hospital and for private cases outside.

It is a substantial building in European style and has a very well equipped outdoor clinic of the most up-to-date pattern. There are special departments for medicine, surgery, diseases of the eye, ear, nose and throat, obstetrics and gynæcology, pediatrics, skin, dental, hydro-therapy and physical treatment and also full laboratory and other scientific departments.

All these departments, including the minor ones such as dental and hydro-therapy, are remarkably well equipped and up-to-date and this applies to all the larger hospitals I visited.

There are 365 beds in this hospital and all but 93 of these are for paying patients. This is a feature of most of the hospitals in Japan, that all patients who can afford to pay anything do so and so there are large numbers of private wards generally of three grades, first, second and third, according to the paying capacity of the patients. In some hospitals also a small fee is charged to out-patients and from these sources a considerable proportion of the running expenses of the institution is met.

During 1924, 34,142 out-patients were seen and of these 30,699 were paying patients and 3,443 were free, and for in-patients the figures were 2,220, and 394 respectively. This shews the extent to which the paying system holds in this institution.

The staff included 74 doctors for 365 beds which strikes one as being very high, one doctor to every five beds and to 461 out-patients.

The nursing staff numbers 95, i.e., under four beds to a nurse.

Osaka is the biggest and wealthiest city in Japan and is the great industrial centre and it is not surprising to find here the biggest and best equipped hospital we had yet seen.

It is a hospital which would be a credit to any great city in Europe or America.

It contains 500 beds and can treat 500 out-patients daily as indeed it does. Besides the usual departments for medicine, surgery, and diseases of women it has clinics for diseases of the eye, ear, nose and throat, children, skin diseases, X-Ray rooms, physical culture and hydro-therapy, and nervous disorders departments. The roof is laid out in a beautiful manner with typical Japanese landscape gardens, dwarf trees, lakes for lotus plants and goldfish, and part of the roof is enclosed as a solarium for children and for early cases of tuberculosis.

There are large numbers of private and semi-private wards where paying patients are admitted and these rooms vary from about ten rupees to about two rupees daily according to the means of the patient. One-third of the hospital is given over to the paying side and in the other 2|3rds treatment is free though in some cases food is paid for.

The medical staff is not so large, being on paper only 21 giving an average of about 24 beds per doctor and with a nursing staff of 130, an average of nearly 4 beds to a nurse.

The equipment of the laboratories and other scientific departments is lavish, the most costly types of equipment being provided.

Remarks on the General Hospitals.—The hospitals we were privileged to inspect were models of their kind and it is evident in the construction of new hospitals that the most up-to-date models are being taken. Money appears to be lavished on equipment, for instance in one of the hospital laboratories for routine work I counted seven microtomes mostly of the most expensive types, and this sort of equipment seems to be the prevailing note. The buildings and wards and the furniture thereof were all of European type, Lawson Tait beds, high lockers, etc., quite different from the construction of houses and the furnishing of Japanese homes. The system of hospital charity is not so marked a feature as in Europe and elsewhere in the East. Here every one is expected to pay something, and to be a charity patient is the exception.

Even when treatment is free small charges are made for food.

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This system is a good one as it induces the spirit of self-help and reduces pauperisation to a minimum.

Another point which struck me was the magnitude of the staff: what with the senior doctors, the junior assistants, the internès, the students, the nurses and the probationers, the wards and more so the out-patient clinics seemed to be much overstaffed and appeared in very great contrast to Indian hospitals which are generally disgracefully understaffed.

The medical profession in Japan is considered to be a very honourable one and young men seek entry to it eagerly. Moreover it is regarded highly by the State and many of the highest offices are open to it. Money is given freely for its necessities and the result is a quickly rising level of national health.

Most of the hospitals are open freely to post-graduate workers and almost all have training schools for nurses who are extending their work outside the hospitals in all directions.

Tokyo Municipal Sanatorium for Tuberculosis.—There are six tuberculosis sanitaria in the country of which the one we saw at Tokyo is much the largest having 800 beds, Osaka with 350 beds and the other four having each 100 beds.

When we visited the Tokyo institution there were 535 male patients and 216 females. The percentage of all forms of tuberculosis in Tokyo is 37.6 per 1,000 and of pulmonary 26.2 per 1,000.

The method of sterilizing sputum by boiling with live steam is good and so are the details for collecting this infective discharge both inside and outside the hospital.

The department of helio-therapy and X-rays was very good and up-to-date and the results are very satisfactory. Artificial pneumothorax is resorted to in a few cases and there are well devised pressure chambers for graduated lung distension in such cases.

There are excellent laboratories and autopsy rooms here and as in other hospitals in this country the most is made out of any pathological material obtainable.

This sanatarium besides being of high standard from the medical aspect shewed in a high degree the best spirit of social service.

They send out a member of their service staff to the houses of patients who are known to have tuberculosis and cannot for some reason be admitted for treatment, and in the same way they follow up the cases discharged and attend not only to their disease but also to their general welfare.

The patients in the hospital seemed very comfortable and happy and recreation or light work was found for all but the severe cases.

The majority were busy doing light work in the garden or helping the nurses in the wards. There was a spirit of peace and hopefulness amongst the patients which is partly due to the fact that they are not hustled out when they begin to improve but are allowed to remain indefinitely if they do not improve or until they are well enough to return safely to the homes.

The Prefectural Mental Hospital of Tokyo.—We visited the above named asylum and found it simple in construction but efficiently administered.

It is run on the non-restraint system and no form of punishment is given. The continuous warm bath treatment is given to noisy and restless patients and there are padded cells for the violent and dangerous class. The commonest forms of insanity are dementia precox 1,351, general paresis, 851 and maniac depressive insanity, 263 during the last five years. As many patients as possible are given employment and the farms, gardens and building operations are almost entirely carried on by the patients. The pathological material is made good use of and the museum contained many excellent preparations and there was a good laboratory for research. Some cases of G. P. I. have been treated with active malaria with good results.

Adequate measures are being taken to deal with the prevention and treatment of leprosy.

It appears that leprosy is on the decline which may be the result of the active measures which have been taken during the last decade.

There are five leper asylums in Japan of which the largest is the one which we visited in Tokyo which has 750 beds, whilst the others have 160, 400, 270, and 500 respectively.

It is estimated that there are 10,000 pauper lepers in all Japan and a scheme is on foot to provide sanatarium accommodation for the large majority of these.

Zensei Leper Asylum in Tokyo.—There is accommodation for 750 and there were actually 721 the day we visited it, of which 125 were females.

Wandering beggars are taken up by the police and sent here, and there are very few escapes though the light fencing affords easy escape.

The fact is that the patients are so well treated that they prefer to remain in the asylum and come from distances to claim admission.

Better class patients who do not care to leave their homes have to undergo supervision by the police and have to conform their lives so as to be as little danger to the healthy as possible.

When asylum patients improve markedly they are allowed on parole but it seems that they almost invariably relapse and no patient has ever been discharged as *cured*.

Vasectomy is done with the permission of the patient, 200 have been performed in 10 years. Women admitted pregnant are allowed to keep the child for a year and then it must be handed over to foster parents outside. About 30 children have been born in the asylum in the last 16 years and none has developed leprosy.

What struck one most was the freedom and absence of restraint so that the asylum was much more like a hospital or a sanatarium than a barrack or a prison as is sometimes the case in India.

Nearly all the farm and garden and building work was done by the patients and for these duties they receive small sums in payment for purchasing extras. They do not use current coin but have a special currency which is only valid for use in the asylum.

Great attention is paid to their recreations and they have books, games, radio sets, amateur theatricals and concerts by outside artists. Religious exercises are much encouraged and are very welcome to these sufferers and all castes and creeds receive equal encouragement. There are schools for the young lepers.

In short this asylum was a good example of a mixture of sound medical treatment with high grade social service, tinctured with religion in its most practical form.

The medical side was as good as could be wished, there was a good museum and adequate use was made of the pathological material, there were a number of excellent casts of cases in all stages of the disease and these were produced to compare with the results of treatment thus giving life-like contrasts.

This is one of the institutions I should like to transfer bodily to India to serve as a model.

Research Laboratories.

The number and high standard of research laboratories is one of the salient features of Japanese medical organisation, and in addition to the well equipped laboratories which are always found to be connected with the big hospitals, as well as the clinical rooms which are attached to each department, there are a number of purely research institutes some of which we visited.

The Kitasato Institute.—This institute is famous both for the work of its illustrious head and for the excellent research work which it has turned out in recent years. There are on its staff such well known men as Kitashima, Shiga and Hata as well as a number of others whose researches are well known to specialists.

The Institute comprises the following departments:—

Scientific Investigations.

Clinical.
Post-graduate.

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Biological preparations.
Testing of same.
Domestic animals.
Administration.

There is an experimental hospital of 57 beds which provides that scientific work will keep touch with the clinical aspect of disease; a necessity that is too often lost sight of.

There were a number of special investigations going on which we were able to see, though time did not allow of more than a somewhat cursory examination of details. The most interesting were as follows:—Tuberculosis, leprosy, rat-bite fever, hydrophobia (with the method used largely to immunise dogs), Weil's disease, distomiasis of the lungs and liver, Schistomiasis japonicum, Tsutsugamushi disease, dysentery (Shiga's work was done here), diphtheria, tetanus, and carcinoma.

Post-graduate courses are given twice a year to groups of 40 students, the courses lasting three months. 2,900 men have thus passed through Dr. Kitasato's hands since this work was begun.

The Government Institute for Infectious Diseases.—This institute is run on very similar lines to the last named, in fact this was originally Dr. Kitasato's laboratory until owing to a difference of opinion with Government he detached himself and started the institute which we have just reviewed.

This building suffered very badly from the recent earthquake and the main buildings were entirely destroyed and now the work is carried on in a series of 60 small buildings scattered about a spacious compound.

This again illustrates the interesting principle of subordinating a hospital to the need of a scientific institution for there is a six-ward hospital accommodating 100 patients and a full nursing staff and home for 50 nurses. There is also an out-patients department. There is accommodation only for 15 non-paying patients and the others pay from Rs. 10—Rs. 3 according to their means.

Non-paying patients are only admitted when the scientific interest of their condition justifies it and they have to submit their bodies to autopsy in case of death. The training school for nurses conducts a two years course before giving a certificate.

The institute publishes two journals, one of which is a prècis of experimental work done in Japan in English, German, French, and Esperanto.

A demonstration of researches was kindly arranged for us by Dr. Nagayo, the Director; it was of great interest and value to us especially those conversant with scientific research into disease.

The same spirit of enthusiasm prevailed here amongst the workers that we learned to expect in scientific institutions in Japan.

The Imperial Hygienic Laboratory.—This is devoted to work for public health authorities and more especially to the preparation, analysis and standardization of pharmaceutical preparations.

There are two main laboratories of this nature, one in Tokyo and the other in Osaka.

The staff (in Tokyo) consists of eight chemists and two physicians of whom one is a medical pharmacologist and the other a bacteriologist.

The hygiene department is concerned with analysis of water, milk, soil, food-stuffs, ices and mineral waters, whilst the pharmacological department is of wider scope.

It examines and standardises drugs used in the Pharmacopœia, and examines patent medicines for poisons and drugs of addiction, and safeguards the standards of their constituents.

Research is carried on into new and especially the indigenous drugs not recognised in the official pharmacopœia.

There is a large herbarium and extensive botanical gardens for controlling the growth of medicinal plants, which are run on modern lines.

The laboratory is self supporting by reason of fees charged and by the mass production and sale of registered medicines.

We saw some of the objects of reasearch such as—"Fugu," the ovaries of the Japanese goldfish.

Thymol carbonate, a tasteless and odourless substitute for thymol which breaks down into thymol and CO_2 in the intestine.

Large supplies of dried anterior and post-pituitary gland from the abbatoir.

Kawa-kawa, a narcotic and anæsthetic plant from the Hawaiian Islands.

The Field Laboratory at Amiya.—This was interesting as being the only field laboratory we saw and probably the only one there was. The problem of the transmission of intestinal diseases such as typhoid, dysentery, and helminthic infections is one of the most outstanding which Japan has to face.

There is no doubt that the incidence of these diseases is very high and shews no tendency to abatement but rather the opposite. There are several reasons for this, but the most important is probably the method of disposing of the night-soil which throughout the country is done by handing it over to the farmer and the market gardener for manurial purposes.

The work at this laboratory was designed to ascertain the length of time during which the fæces when kept under the ordinary conditions in domestic privies retained their infectivity, both bacillary and helminthic. There was also an attempt being made to devise a privy and cesspool which should sterilise the fæcal matter before it is handed over to the farmer.

The persistence of typhoid infection in stored fæces is much longer than we are accustomed to consider probable in the tropics.

With an average temperature of 15.9°C. typhoid bacilli remained living for 47 days; at 18.8°C. for 44 days; and at 18.2°C. for 39 days. With higher temperatures such as around 25°C. the persistence was much lower, viz., 4 to 10 days and sometimes less. This suggests that in India with its higher temperatures bacilli of enteric and dysentery groups would not persist longer than 3 or 4 days.

With the ova of worms the duration of life was still longer, viz., hookworm eggs persisted for 86 days at 18.7°C.; for 84 days at 22°C.; for 66 days at 22.5°C.; and also at 23.7°C.; and about 40 days at 25°C. The eggs of roundworms persisted even longer, 99 days at 18.7°; 97-66 at 21.9°C.; and 63 days at 23.7°C.

The idea of the investigators was to allow decomposition to go on in the pits till the bacteria and ova were destroyed and then to issue the fæces to the farmers and for this purpose a special type of cesspool was under investigation.

The final results of this investigation will be of interest in all tropical countries.

The Imperial Government Institute for Nutrition at Tokyo.—This laboratory impressed me and my colleagues on the League of Nations Interchange as the most notable of all the institutions which we visited in Japan. We agreed that we would impress upon our respective Governments the desirability of doing something of a like nature in other countries in the East.

The Japanese have always been in the forefront where defects of nutrition and deficiency diseases required investigation, and the abolition of beriberi in the Japanese navy was a world-famed example of this. The names of Takagi, Mori, Suzuki, and Kumagawa are well known in this connection and their mantle has fallen on the shoulders of the present director and founder of this new school of nutrition.

Dr. Saiki is a man of great personality and abounding enthusiasm and we paid repeated visits to his institute to familiarise ourselves with the principles on which it is conducted.

His full report is unfortunately printed in Japanese but he is engaged in translating into English and this edition will be awaited with great interest. He experienced some difficulty in financing the English edition, so the Director of the Health Department of the League of

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Nations, Dr. Rajchman, who was with us in Tokyo agreed to obtain from the League a grant to enable Dr. Saiki to hasten the new edition.

Dr. Saiki has working with him six medical men, five pharmacologists, six agriculturalists, four chemical engineers and some others.

His budget is Yen 150,000, i.e., about 2½ lakhs of rupees.

The institution is divided up into four departments, viz.:—

(*a*) Investigation of the fundamental science of nutrition.

(*b*) Investigation of the applied science of nutrition.

(*c*) Department of enquiry, statistics, exhibition and propaganda.

(*d*) Department of administration.

(*a*) The first named is sub-divided into the following sections:—

1. Food chemistry.
2. Metabolism.
3. Physiology and pathology.
4. Microbiology.
5. Physics.

(*b*) The department of applied nutrition is divided into:—

1. Investigation of food materials.
2. Natural food products (including aquatic products and famine relief food products).
3. Food industries.
4. Investigation of the animal and plant kingdom for new foods.
5. The division of economic nutrition.
6. The division of preservation and distribution of food-stuffs.
7. The division of cookery and table ware.
8. The division of infantile nutrition.
9. The division of utilization of waste products.

We saw much work of great interest on these various problems. One or two remain particularly in my mind such as—

Beautifully hand coloured drawings of the various foods which might be used as substitutes for the more usual in times of shortage. Dr. Saiki had tried these all on himself and devised methods of cooking to make them palatable, much as our Frank Buckland is said to have eaten pieces of the flesh of all the creatures which died in the London Zoo.

The methods of producing and dissolving stones in the bladder and kidneys of animals by changes in diet with special reference to vitamines (a subject of great possibilities to India).

The production of cancerous changes in the stomachs of rats by vitamine defects.

Cheap and nutritious menus prepared for poor families and published in the daily press.

Pamphlets and hints on cooking published in the press and broadcast in pamphlet form.

Lectures to school teachers and educationalists on the principles of nutrition.

Studies in animals on the relation of diet to reproduction.

Propaganda posters and a very good exhibition where all the common food-stuffs were shewn in models with comparative figures as to their relative nutritive values.

These are some out of the many valuable things which Dr. Saiki had to shew us. He also shewed us an interesting method of distinguishing the age of rice and its probable content of vitamine B.

Chemical Method of distinguishing the age of rice.

Take polished or unpolished rice of unknown age. Make a solution of—

Paraphenylendiamin, 1 per cent. ..	5 c.c.
Watery solution of gulacol, 1 per cent.	10 c.c.
Hydrogen peroxide, 1 per cent. ..	0.2 c.c.

Pour this solution over the rice in a Petri dish.

When the rice is new it turns purple in under 3 minutes.

When the rice is old there is no change in colour.

Saiki says the reaction is due to an enzyme or catalyst which is either vitamine B or runs parallel with vitamine B.

This test determines—

The age of the rice,
The degree of polishing,
The presence of vitamine B.

I wish to impress upon those who read this report the necessity there is that India should take up more fully this important study of nutrition and I intend to return to the subject at a later date.

MEDICAL EDUCATION IN JAPAN.

A student who intends to take up the study of medicine would ordinarily enter a middle school at the age of 12 and work there till 17.

He would then compete for a place in one of the Higher Schools and if successful would complete three years in this school in learning such pre-science and pre-medical studies as mathematics, zoology, botany, physics and languages such as Chinese and either English or German, one of which latter two is compulsory. Most advanced men take both these languages but until recently most of the science and medical students took German. Since the war however and especially due to the fact that most post-graduates go to America rather than to Germany, English is the prevailing language.

Emerging from these Higher Schools the student proceeds to one of the Universities or higer medical schools and undergoes four years of study in purely medical subjects.

There appeared to be another portal comparable to our "Double College" examinations at home, and this would be chosen by those who had not succeeded in getting into one of the pre-medical schools and who would have a somewhat lower standard of general education. For the higher schools and the university courses there are generally more applicants than vacancies so that these examinations are actually competitive.

There are five Imperial Universities, five Government Medical Colleges, four public Medical Colleges, and two private Medical Schools.

There are also four private higher medical schools which are outside the Universities ordinance.

These higher medical schools both public and private are to be abolished and the universities extended to meet the growing needs of the community.

We visited several of the Imperial Universities, one or two of the Government medical colleges, and the Private Medical College of the Keiogijuku University.

Speaking generally there appeared adequate accommodation and equipment in the laboratories and class rooms of these institutions, but the Imperial University at Tokyo shews sad evidence of the ravages of earthquake and fire which had caused overcrowding and deficiencies in equipment which were inevitable. The great library of 700,000 books was completely destroyed in a few hours, a loss great as it was, being merely an incident in so great a holocaust.

It is almost impossible for an outsider especially on such a cursory examination as we were afforded to form any real estimate of the standard of medical education which these universities and colleges afford. The men with whom we came into contact were naturally the pick of their profession and we had little opportunity of judging the level of the average medical practitioner which is the ultimate standard of medical education in the country.

I should expect however that the average general practitioner was definitely on a lower plane than his colleague in the most civilised countries in Europe.

There are no special schools in hygiene and no diploma in public health. Hygiene is amongst a large number of other subjects for the final examination but it takes a very small place and we were informed that very few men can be found to take up work in public health so that in this respect the medical service of Japan is markedly behind hand. This was reflected in many ways because although on paper the public health

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organisation was excellent, in actual practice it was sometimes obviously defective.

The "Yoshiwara" system is in vogue, that is, a separate part of each city retained or set apart for prostitutes.

In the year 1927 there was a daily average of 48,000 prostitutes in these licensed quarters and the total number of medical examinations of these in the year was 3,068,180 of which 71,575 revealed venereal disease. The amount of venereal disease per head of prostitute per year was only 2.33 per cent. Each woman was admitted to a lock hospital 1.48 times per year for an average duration of 18 days. The medical examination of prostitutes is carried out frequently and any diseased are forced to go into a lock hospital till cured. It is stated that geisha (dancing girls) and waitresses and other young women especially exposed to risks have by law to submit to periodic medical inspection. We visited the lock hospital in Tokyo but the inspection was not satisfactory as the patients were kept out of the way and the figures shewn to us were incomprehensible. The building and furnishing was much below the usual standard of Japanese hospitals. We were not given an opportunity to inspect the medical arrangements provided in the Yoshiwara but understand that anti-venereal methods are taught to the girls. The amount of disease amongst the general population is difficult to arrive at, but judging from the amount amongst the women one would suppose the percentage to be high. The figures giving the infections amongst recruits coming for army examination is only 15 per cent. and has been steadily falling. There are no figures to shew the percentage of a positive Wassermann reaction in a random sample of the population. We asked a number of questions on this subject at the final conference and it struck me there was a good deal of official reticence in the matter, but it seems that the system they have given rise to less offence than the more open methods seen in Europe. At any rate street solicitation is entirely absent in Japan, at least it seems so to the foreign eye. It appears that anti-venereal measures are entirely directed towards the female sex and that there is no arrangement made for male prophylaxis or treatment, other than the out-patient departments of the ordinary hospitals and by private physicians.

Miscellaneous Public Works.

The Water Works at Tokyo are very large and kept in excellent order. The water comes from the River Tama many miles away and is led into two large reservoirs, which we visited, about ten miles outside the city, the capacities of which are 138 and 510 million cubic feet respectively. It is then brought into Tokyo and passed into settling ponds, four of them, each holding 3 million gallons. It then passes into filter beds 9 ft. thick, i.e., 3 ft. sand and 6 ft. of gravel.

It passes through at 5 inches an hour or 10 ft. in 24 hours, the sand is cleaned once a month and three inches of bacteria and algæ removed. There are 24 filter beds each about 7,000 sq. feet.

About 60 per cent. of the inhabitants of the city use the piped supply, the rest use well water. This system supplies 11 to 12 million gallons per diem but this is insufficient for nearly 2 million people so there is a big extension on foot. This when complete will supply 18 million gallons per day which will allow 6 gallons per head per day for a population of 3 million people. The present population of the city is said to be 2,180,000 but we understand that since the earthquake it has fallen to below 2 million and now takes second place to Osaka.

The cost with the proposed extension will amount to about 57 million yen, i.e., about £5½ million sterling.

The average bacterial counts per c.c. are:—

At the source 1,940 colonies
Settling pond 1,953 colonies
Filter bed 11 colonies
City hydrant 29 colonies.

(presence of *B.coli* not given.)

Sewage Disposal.—This is a matter in which Japan is very behind hand, for with a few exceptions there is no water-carriage system of sewage disposal in the whole country. Even in the largest cities, the privy or midden system holds. The Japanese are dependent largely on the farmer and the market gardener for much of their food and it has always been the fixed custom to use the valuable manurial qualities of human excrement for the fields and gardens. Until recent years this had a definite market value and it was the custom for the farmer to send in to the towns and cities to buy, and collect free, from the householders their privy contents. More recently the amount of agriculture near the cities has been reduced and wages have gone up so that farmers will no longer trouble to collect the manure even on payment. The municipalities have had to take over this duty in the cities and either deliver it for sale direct to the farmers or dump it in the river or in the open country.

In Tokyo, a commencement has been made in the sewerage system and a disposal plant started which we saw. As however, there is practically no water carriage system in vogue the nuisance is very little abated. The sewers have hoppers opening on to the street in certain places and down these are shot the fæcal matter collected from neighbouring cesspools. The sewers are chiefly useful to conduct storm water sullage water from gullies and nallahs and such trade effluents as are discharged into them. The greater bulk of the cesspool contents are still carried through the open streets in tubs on an ox-cart and it is not uncommon to meet a score of these unsavoury vehicles and perhaps to be jammed in traffic behind them. The contents are liable to slop over and swarms of flies are attracted to the tubs and to the spillings.

This being the state of affairs one does not wonder that the chief cause of death in Japan is "diarrhœa and enteritis" which easily heads the list with nearly 120 deaths per thousand. This does not include typhoid fever or dysentery which add 10 and 2.8 respectively.

The infant mortality is too high for the temperate zone and has slowly risen from 145 in 1913 to 157 in 1922 per 1,000 infants under one year. It seems indeed that the high death-rate due to these diseases is due to the high infant mortality due to the same cause, as in the age distribution of "diarrhœa and enteritis" out of 1,000 deaths at all ages no less than 702 are in infants under one year.

Disposal of Refuse.—This system is as little developed as is the sewage system.

Only 8 cities and 3 towns have any facilities for incinerating rubbish, 5 other cities and 8 towns burn it in open dumps and the rest dump it unburnt or use it for "making" land.

We saw 2 incinerators, one in Osaka which is the most up-to-date in Japan and one in Kyoto.

There is nothing much to describe about these as they are of the usual pattern except that concrete blocks and drain pipes are not made from the final products of incineration as they are in England but the ashes are sold as having some manurial value.

Only about a third of the city garbage is thus disposed of: the remainder is either sold in its original state as fertiliser or is dumped into lakes or lagoons.

Primary Schools and School Hygiene.—One of the most praiseworthy aspects of national life in Japan is the extraordinary amount of attention both State and private which is accorded to children and young people.

The shrine and palaces and national monuments are thronged with parties of children and young people such as boy-scouts and girl-guides being led round and taught concerning the national treasures, its sacred places and its memories of national heroes and great men.

The result is an intense national pride and patriotism which is one of the most remarkable features of the people. Every opportunity is taken to educate the young and I remember on a cold morning in the Inland Sea at 6-30 a.m. seeing the captain of the ship

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holding a class for young people on the principles of navigation.

This explains the unity of the nation, their desire to acquire knowledge, their obedience to discipline and their reverence for the Emperor and his officers right down to the lower grades of official. The national religion of Shintoism, i.e., ancestor worship, contributes to this feeling of passionate nationalism.

We only visited one school, the Bancho Primary School, but were full of admiration of the organisation, the equipment and the attitude of the children. On looking through the duties and the regulations defined for their daily life one only wonders that they have any time to be just children and the règime would seem to be over organised and destructive of individualism, at any rate to the English mind. The normal children have every attention but the abnormal, the mutes, the backward and those defective physically have if anything still more care.

Physical Culture.—We were taken to watch the national games at the Meiji Shrine and on other occasions saw displays of judo, jujitsu and fencing.

These martial exercises are universally indulged in by the youth of both sexes and have a more obviously serious import than the games of our young people. In the words of the prospectus of Butokkwai "the object of these exercises is not only to teach the art of self-defence but also to cultivate the spirit of knightly valour. This spirit is a crystallization or combination of the personal virtues, courage, kindness and fair dealing."

The Institute of the Science of Labour.—This new science has already some recognition in Japan and we were able to pay a very rapid visit to the institution and to see something of its work.

Work was in progress on such problems as the following:—

Studies in industrial fatigue.
Studies of the factors affecting growth.
Studies of the factors affecting mental development.
Studies of the factors affecting physiological functions.
Industrial development and the birth-rate.
The evils of night work in factories.
Temperature, humidity and ventilation in workrooms. (In this work Leonard Hill's katathermometer was in use.)
Individual disposition and efficiency.
Physiological selection of workers.

The laboratories were well supplied with the most recent instruments for psychological research.

It is interesting to note that this institute was started by a big mill-owner and the work tested on his own operatives.

A very interesting paper on this subject was read at the recent congress in Tokyo by the Director of this institute entitled "Woman in Industry and her Sanitary conditions."

His conclusion is that "women are working under extremely unsuitable conditions. These inhuman labour conditions and the deficient factory administrations have found expression in the high rate of absence from work and the frequent rate of sickness."

Welfare of Railway Employees.—These Government servants have a special organisation to safeguard their interests.

Abattoirs.—These which were formerly in private hands are gradually being taken over by municipalities so that there are 328 public and 329 private ones. We saw the ones in Tokyo and Osaka.

The method of killing is very humane. A heavy metal hammer is placed against the forehead and a cartridge exploded into the brain which drops the animal immediately. It is then pithed with a bamboo wand. The surroundings were quite sanitary and there are full inspections of the live animals and of their flesh after death. Tuberculosis is almost unknown in cattle, Professor Nagoya could only remember about five cases in 20 years' experience.

It is evident that bovine tubercle cannot be a cause of the very high incidence of the human disease in Japan.

We were very interested to see in all the abattoirs a stone pillar erected in the entrance with an inscription on it and to learn that the butchers bowed to this on entering for their day's work.

We were told that this is a memorial to the memory of the cattle which are slaughtered and a free translation on the stone would be "To the spirits of the honourable animals who die here."

There are similar shrines in some laboratory gardens to the spirits of the animals used for experiments and Prof. Shiga informed us that there is a certain day set apart when offerings of rice and other things are made at these shrines.

This practice is of Buddhistic origin.

Crematoria.—The large majority of the dead bodies are cremated, at least in the cities. In Tokyo for instance about 90 per cent. of all dead are cremated and only ten per cent. are buried either in cemeteries or more rarely in the gardens of temples. Crematoria are privately owned and the one we saw in Tokyo was a very up-to-date electric apparatus.

Milk supplies.—Milk is not a favourite article of diet in Japan and it is only recently that its sale has increased sufficiently to require Government supervision. Children are fed on pap and rice in default of their mother's milk and of recent years the importation of dried and condensed milks has been going up very rapidly.

Vaccination.—The population is very well vaccinated as the ratio of unvaccinated per 1,000 were:—Below one year 14, below 2 years 6.8, below 3 years 4.1, below 4 years 3.1 and below from 4 to 15 years 7.7, figures which compare favourably with any country in the world. The vaccine lymph is sterilised by the chloroform method and appears to maintain its potency for three months, except in the hottest season.

CONCLUDING REMARKS.

This Japanese tour has been of great value to me as a personal experience, but one of its objects, perhaps its chief one, was that India should benefit by the comparison of her institutions with those of another Asiatic nation.

It must be realised from the first that there are several reasons why that comparison is very difficult.

In comparing two places from the point of view of public health the matter of prime importance is the relative geographical position of the two, which is the factor governing their respective climates and consequently their indigenous diseases and the chances of any epidemic diseases which reach them of establishing epidemic conditions.

The second is what we may call the "basic sanitary unit" which is the individual of which the nations are composed.

In both these respects Japan and India differ fundamentally.

Japan though an Eastern nation is under conditions to be found elsewhere in the temperate zone, and her conditions though comparable to Europe and the United States were not so with other eastern nations which are in the tropics and sub-tropics, and it was from these countries that almost all the delegates to the inter-change had been deputed.

The factors governing the "basic sanitary unit" were almost as different.

The Japanese are essentially a clean race, clean in their persons and meticulously clean and tidy in their habitations and their surroundings, they are a united nation with one creed, without religious prejudices and without caste, they are of a high standard of general education, quick to see the reasons for a desirable change and willing to accept it, obedient to authority and withal of a passionate and almost fanatical patriotism.

With a people so plastic and so malleable it is easy to see that the path of a reformer is an easy one.

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The Japanese people have been undergoing since these last fifty years or less a veritable renaissance, and public health has undergone and is still undergoing remarkable progress.

I am well aware that they shewed us what they wished us to see and equally aware that they had skeletons in their sanitary cupboards, but the point is that they knew they were skeletons and were in every case planning to get rid of them. There was nothing we could suggest that they had not already considered and in most cases had schemes to improve undesirable conditions even if those schemes were as yet scarcely beyond the paper stage. I read carefully a pamphlet styled "Health Organisation in Japan" which was prepared especially for the League of Nations and for our visit, and after reading it I wondered what there could be left to criticise or to suggest, but our first drive through the streets of Tokyo convinced us that to a considerable extent theory had outrun practice.

The condition of the streets, the crude way of filth disposal were quickly borne in on us, but later we realised that the former could in great measure be explained by the late disastrous earthquake and for the latter their best endeavours were being made to find a solution.

The students take very kindly to medicine and especially to research; they are clever with their hands and prefer practical work to theory and book reading.

As a result the hospitals and laboratories and other medical institutions are crowded with keen and energetic students and doctors and both they and the nursing and the technical assistant class are available in very much larger numbers than in similar Indian institutions.

As to the financial side, I am not able to make a comparison, but I judge that very much larger sums are voted for medical budgets in Japan than in India according to any standard that one may take.

The result is that the scientific institutions and the hospital wards and particularly the out-patient departments are extremely well, even lavishly, equipped with all the latest instruments of precision.

Apart from these matters the institutions I should most like to see transplanted to, or copied in, India are their port quarantine arrangements, their leper asylums their mental hospitals, and certain scientific institutions —particularly their Institute of Nutrition. I speak here without knowing very much personally about the first named, but for the others I know the Japanese models would be a decided advance on anything we have in India.

If I had one recommendation to make it would be in favour of the Institute of Nutrition, which struck us all as the most vivid of all the institutes we saw in Japan. I went so far as to ask Dr. Saiki supposing he were approached, would he be willing to come to India and advise the Government of India on the question of starting a similar Institute for India.

I think that if the laboratories were built and equipped it would require a budget of not less than two lakhs per annum, but I think that first of all Dr. Saiki should be asked to come and give his views.

It would not be proper to close even an official report without some reference to the almost overwhelming and lavish hospitality shewn to us by our Japanese colleagues, to their courteous reception of our party and of our numerous enquiries at every turn.

We were given freely of all information we required and their organisation of the complicated tour of eighteen foreigners, speaking more than one language, visiting in parties of six a very large number of different places in sequence, must be realised in order to be fully appreciated.

At the same time if such an inter-change is to take place in India, there are ways in which the procedure should be modified and even improved, but the organisation will not be improved upon and India will certainly not be able, as I warned them, to reach such a scale of hospitality and of public recognition as was shewn to us.

This report is written in Peking and here also I have been able by the kindness of the Chinese Government to get some insight into their public health system and it may be some consolation to India to know that she is as far ahead of China in matters of public health as Japan is ahead of India.

Current Topics.

The Ronald Ross Gate of Commemoration.

AN exceedingly interesting ceremony took place in Calcutta on Friday, January 7th, 1927, when His Excellency Lord Lytton, Governor of Bengal, unveiled a commemorative gate in honour of Sir Ronald Ross near his old laboratory in the Presidency General Hospital. The memorial is in the form of a gateway bearing a bronze medallion of Sir Ronald in the centre above the arch; whilst on the left is an inscription to the effect that in the small laboratory 70 yards to the South-East of the gateway Sir Ronald Ross made his ever-memorable discovery of the mosquito transmission of malaria, and to the right of the medallion is a quotation from a poem which he wrote when he first found that the malarial parasite underwent development in a mosquito. We give below a photograph of the memorial; also a photograph of the medallion, for which Sir Ronald gave special sittings in London last year. There was a large gathering of the leading citizens of Calcutta.

In asking His Excellency to unveil the memorial, Lieut. Colonel J. W. D. Megaw, C.I.E., V.H.S., I.M.S., spoke as follows:—

Your Excellencies, ladies and gentlemen,

It is astonishing that so few of the inhabitants of Calcutta know of the existence of the little laboratory a few yards from this spot in which Sir Ronald Ross made one of the greatest discoveries in the history of the world. In the hot weather months of 1898 Surgeon Major Ronald Ross, I.M.S., found out how malaria is conveyed by the mosquito.

This discovery has been exploited to some extent; it has led to the saving of many thousands of lives, and to the reclamation of large tracts of country which would otherwise have been uninhabitable, but though 28 years have elapsed since it was made, we are only beginning to scratch the surface of the vast mine of wealth which it has placed in our possession.

If Sir Ronald's discovery were fully applied it would add millions of healthy human beings to the population of the earth, it would bring health and prosperity to many millions who now exist in poverty and ill-health. There is no other discovery for which such claims can justly be made.

About ten years before he made his great discovery Ross wrote the following lines which breathe a prophecy and a prayer:—

"In this, O Nature, yield I pray, to me.
I pace and pace, and think and think, and take
The fevered hands and note down all I see,
That some dim distant light may haply break.
The painful faces ask—'Can we not cure'?
We answer 'No, not yet; we seek the laws.'
O God! reveal through all this thing obscure
The unseen, small, but million murdering cause."

The answer to the prayer came after years of toil, but even before he had completed his discovery his confidence of victory was expressed in the lines which are now inscribed on the gate of commemoration which Your Excellency is about to unveil.

"This day relenting God
Hath placed within my hand
A wondrous thing, and God
Be praised, at His command,
Seeking His secret deeds
With tears and toiling breath
I find thy cunning seeds,
O million-murdering Death!
I know this little thing

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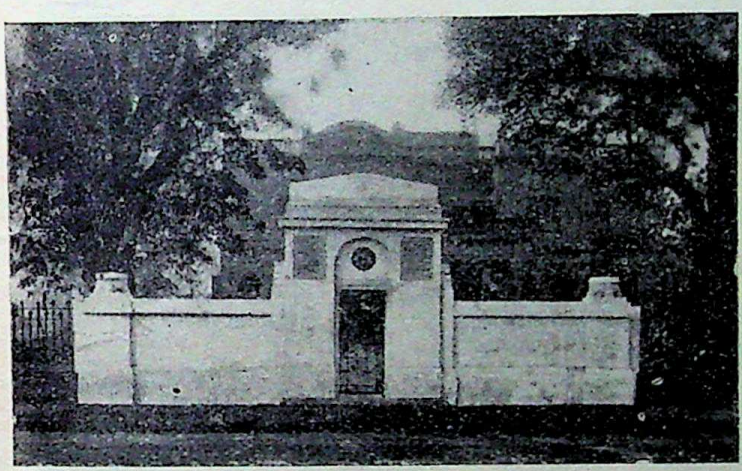
A myriad men will save.
O death! where is thy sting,
Thy victory, O Grave?"

"A prophet is not without honour save in his own country." Sir Ronald's offence did not consist merely in being a prophet, he added to it by being a poet and a scientist, and so he trebly earned the indifference with which his great work was received in India.

Sir Ronald, not unnaturally, has often complained of the apathy and even opposition which he encountered. I have sometimes thought that the obstacles which were placed in his path may have been blessings in disguise. There are a few men of genius like Sir Ronald Ross and Sir Leonard Rogers, to whom obstacles are but stepping stones by which they climb to still greater heights of achievement.

If Sir Ronald had lived in times like the present under the benevolent rule of Your Excellency, he would have had no cause to complain of lack of encouragement or recognition; but would he have accomplished so much if he had been the pampered protégè instead of the grim and misunderstood worker, who had to fight for every opportunity to carry on his research? Certainly he could hardly have done more. He not only discovered how malaria is conveyed, he showed how the disease can be controlled. He himself at first was the only one who had the clearness of vision to see the vast results which would follow from his work. He was sadly mistaken



The Ronald Ross Gate of Commemoration.

when he imagined that the world would at once perceive the value of the great gift which he had placed at its disposal. The men of science might have been expected to realise the great possibilities of his discovery, but even they were unable to make the forward intellectual stride which was needed if they were to form a true estimate of its value.

Ross was years ahead of his times: in those days the suggestion that disease could be controlled by suppressing mosquitoes provoked a sarcastic smile and the author of the proposal was regarded as an enthusiastic visionary. This indeed he was, but not in the vulgar sense, his vision was clear and his enthusiasm justified. It was the people of the time whose eyes had not yet been opened.

The completeness of his discovery was remarkable. If we knew nothing about malaria except what Ross found out, we should still be able to control the disease. If our knowledge consisted of what others discovered independently of the work of Ross we should know but little of the means of preventing malaria.

It is, therefore, not surprising that we should be so eager to mark the birth-place of his discovery. What is surprising is that after so many years it should be left to us to have the privilege of doing so.

The gate of commemoration which Your Excellency is about to unveil, though small in size and insignificant in appearance, will form a land-mark in the history of civilisation.

In unveiling the Memorial, His Excellency Lord Lytton made the following speech:—

"Ladies and gentlemen,

Colonel Megaw is quite right in saying that the ceremony which you have asked me to perform to-day is one that gives me unusual pleasure. We are commemorating an event from which every class in the community has already derived benefit and may yet derive even greater benefits in the years to come. We are honouring a man whom every Englishman and every Indian without distinction of creed or party is glad to honour. Seldom indeed has it fallen to my lot in the last 5 years to find myself the spokesman of such a completely unanimous opinion. There is not a man or woman in the whole of India who would grudge Sir Ronald Ross the highest measure of praise and gratitude which can be expressed in words.

His achievement, I think, is even greater than Colonel Megaw has described it, and I don't think any one will accuse me of exaggeration, if I say that Sir Ronald Ross's discovery has been the greatest contribution to medical knowledge since the days of Pasteur. So familiar are we now with the connection between malaria and the mosquito that it is difficult for us to realise how startling was the first announcement of this fact, nor how sceptical was the generation to which it was first made. Yet this knowledge, on which so much depends, we owe not to any accident but entirely to the patient, thorough and successful research of one man—the man whom we have met to honour.

The consequences of this discovery which seems to us so simple, so obvious, have had, as Colonel Megaw has reminded us, the most far-reaching results. Not only has it revealed the cause of malaria, improved the treatment of the disease, helped towards its prevention and indicated the steps by which it may one day be eradicated, but it has also led to research along similar lines into the causes and treatment of other malignant epidemic diseases. Indeed, the whole of that magnificent and valuable institution of research of which Colonel Megaw is now himself the distinguished Principal may be truly said to owe its very existence to the work of Sir Ronald Ross.

Reading through the *Memoirs* of Sir Ronald's life, one is struck by his versatility, his high idealism and his perseverance in the face of difficulties and obstruction; and it is such qualities as these that have made him one of the world's greatest benefactors. There is also another side of his personality which deserves to be mentioned. I was once told that the historian Lecky, whose friends would never have suspected him of harbouring military ambitions, once confessed to a friend that the great regret of his life was that his parents had not made him a soldier, and he has left on record a poem in which this strange regret is half revealed:

'Not every thought can find its words,
Not all within is known;
For minds and hearts have many chords
That never yield their tone.
Tastes, instincts, feelings, passions, powers,
Sleep there unfelt, unseen;
And other lives lie hid in ours
The lives that might have been.'

I half suspect from the lines which Colonel Megaw has quoted, and some of which are reproduced upon the Gate of Commemoration which I shall presently unveil, that Sir Ronald Ross too is conscious of a 'life that might have been' and would perhaps rather be honoured as a poet than as a man of science. If so, this only reveals to us the breadth of his human sympathy, and adds to the measure of our appreciation of him. His self-imposed mission was to rid India of the scourge of fever from which it suffered, and he worked incessantly, ungrudgingly, in spite of disappointment and difficulties which might well have deterred other men from their purpose, until after four years of unremitting toil he succeeded in finding the secret. Not content with disclosing the secret for the benefit of mankind, he completed his task by laying down detailed plans for the control of the disease.

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Four years after he made his discovery Sir Ronald Ross had an opportunity of making his first great demonstration of its vast possibilities by freeing Ismailia of malaria at a time when the evacuation of the town was being seriously contemplated. He therefore showed by their practical application the immense value of the principles which he had established. So comprehensive were the plans he laid down that it was on their basis that all the great successful experiments in freeing the Panama Canal zone and other areas were subsequently carried out. It is nothing short of miraculous that such results should have been obtained by the discovery of one man and that he, almost unaided, should have been able to detect not only the means by which malaria is carried, but also the means by which it can be prevented.

Another fact which we are commemorating to-day and which we in Calcutta are proud to remember is the fact that this momentous discovery was made in this city in a small laboratory a few yards from this spot. That nearly 30 years should have passed without any recognition by Calcutta of Sir Ronald Ross's services to humanity is a reproach to this city, which I am glad to say is now at last going to be removed. It is customary to erect monuments and commemorative tablets to mark the sites where men have died or are buried, but so far as I know there are few such monuments to mark the place where knowledge has been born. Yet what could be a happier subject for commemoration than the birth-place of knowledge? We are all proud that Calcutta should have this distinction, but unfortunately other parts of the world have as yet derived more benefit from Sir Ronald Ross's discovery than the Province which gave it birth. Panama, Ismailia and West Africa owe their freedom from fever to his work. The Malay Peninsula, he tells me, is making good use of it. Bengal in 30 years has profited but little by it and is still a victim to the ravages of this disease. That is another reproach which after to-day's ceremony I hope we shall do something to remove.

There are two agencies in this Province that are concentrating the best available experience upon a war against disease. They are the School of Tropical Medicine and the Co-operative Anti-Malarial Societies—the one an official and the other unofficial organisations. The best memorial we could erect to Sir Ronald Ross, the best use we could make of his discovery for the benefit of Bengal would be to raise a large endowment fund for the support of these two organisations. The School of Tropical Medicine is carrying on Sir Ronald Ross's work, is adding every year to our knowledge of the causes of diseases and the methods necessary for their prevention. They are the Intelligence Department of the Army of Health. The Co-operative Health Societies are the field force, they are carrying the knowledge obtained by the School of Tropical Medicine into the homes of the people and enlisting their co-operation in preventive measures. Funds are urgently needed for the support of each and I hope that as a result of this meeting a movement will be set on foot to raise a fund associated with Sir Ronald Ross's name to develop the work which these organisations are doing, and to carry it into every village in Bengal.

Sir Ronald's discovery has been worth many millions of pounds to the human race, apart altogether from the saving of life and the prevention of sickness. By the application of the principles which he laid down we can save many more lives and money for Bengal, we can restore the vitality of the Province and enable her to take a more prominent and valuable place in the work of the Empire."

Sir Ronald Ross, who was obviously deeply moved with emotion, then made a brief speech which was in his happiest vein. He spoke as follows:—

"Your Excellency, ladies and gentlemen,

I trust that you will excuse me if my remarks are but brief. There are some moments in a man's lifetime when he is so overcome with emotion that he can hardly speak, and this is such a moment to me. I can only say that it is the proudest moment of my life. It is but rarely that men of science receive such recognition during their lifetime. I feel that I ought to be dead; but there is a good deal of life in me still.

If I may, Sir, I would like to recall the names of a few of the many who were associated with me in research work in malaria. I would refer to Dr. Alphonse Laveran, my master, who discovered the parasite of malaria, a man whose genius was typical of the great nation from which he sprang. I would refer to Sir Patrick Manson, from first to last my sponsor, and the man who put me on to the right trail. I would refer to Surgeon-General Harvey, at that time Director-General, Indian Medical Service. It is true that during these years of work I complained constantly and continuously. But what is the use of being a great man if one is not allowed to 'grouse'? My grievances were genuine. It is true that my work was subject to constant interruptions. Surgeon-General Harvey could not help that, he could not prevent it, but he did his utmost to mitigate the circumstances, at every step he showed his interest and did all that he could to further my work. I would also like to refer to the subsequent work of many workers in India, including such men as Christophers, James, and Bentley.

Medallion on the gateway.

Discovery is always progressive and I should like to refer to the many workers who have added to our knowledge of malaria, many of them worked in India, their names are well known. I should like to mention a little incident that happened while I was working in my little laboratory. The late Colonel Maynard always took a keen interest in my work. I well remember the morning when I first came across the oöcysts of the parasite of bird malaria in mosquitoes. I rushed out of the laboratory and came across him about a hundred yards from the hospital. I said to him 'I have got them again.' He looked greatly astonished and evidently suspected me of having got something quite different from oöcysts, but when he came to the conclusion that I was still in my sober senses—though he was probably sceptical as to the importance of the insignificant little objects which I showed him—he came across to see them.

I would like to refer to my bearer, Lachman. He is here to-day, standing in the corner of the tent. He was a faithful and a valuable servant and one who did much to help me in the laboratory. I would like to refer to my laboratory assistant, Mahomed Bux. He is dead now, poor fellow; he was for many years in the laboratory here after I left and he died here. He had

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only one failing, a fondness for smoking Indian hemp. At nights after he had had his pipe, his last conscious action before he fell down stuporous would be to chase away marauding cats from the mosquito nets within which were my birds and my mosquitoes.

Revisiting the scene of my work, Sir, after a lapse of twenty-eight years, I see very great changes. My old laboratory used to have black, soot-stained walls. It is now red. The hospital used to seem much closer to the laboratory than it now is. There was a simply magnificent ditch just outside the laboratory. I had only to step out of the laboratory and dip a pail into it to obtain a rich supply of various kinds of mosquito larvæ. They have gone and filled in that ditch. The place seems changed, somehow, and I much regret the disappearance of my valuable old ditch.

In conclusion, Your Excellency, I can only repeat that I am very conscious of the great honour which you and the citizens of Calcutta city have done me by erecting this memorial to my work."

After Sir Ronald's speech, His Excellency left the *shamiana* erected for the ceremony, crossed the road,

Sir Ronald Ross, K.C.B., K.C.M.G., F.R.S., standing at the gate.

and unveiled the memorial. He then opened the commemorative gateway and was conducted by Sir Ronald to the laboratory in which the great discovery was made.

The commemorative gateway faces on Lower Circular Road in front of the Presidency General Hospital, Calcutta; and it will be in full view of the thousands who pass along that road daily.

On Monday, the 10th of January, Sir Ronald delivered a lecture on malaria to a large audience at the Empire Theatre, Calcutta, under the presidency of His Excellency the Governor of Bengal. Sir Ronald told the story of his discovery to a deeply interested gathering. He referred to the recently established Ross Institute in London and thanked the many subscribers from India who had helped in promoting the cause of the Institute.

When not to Operate for Hernia.

(*British Med. Journ.*, Sept. 11, 1926, p. 486.)

MR. MCADAM ECCLES holds that there are a number of conditions in connexion with hernia which negative operation. In the following cases operation is undesirable:—

1. *The very young.* Because: (*a*) Nature tends to bring about a cure. (*b*) Very young children do not stand operation well. (*c*) Asepsis is uncertain.

2. *The "aged"* (over 60). Because: (*a*) The tissues are not in most cases such as allow of a radical cure. (*b*) Persons do not like operation and then to have to wear a truss. (*c*) A properly made and properly adjusted truss will bring about such an improvement that the person may not know that he has a hernia.

In Males.—(*i*) In large inguinal hernia it is difficult to occlude the inguinal canal and the apertures sufficiently, so long as a passage for the spermatic cord has to remain. (*ii*) Where there is much disturbance of micturition, the result of enlargement of the prostate.

In Females.—(*i*) Cases in which pregnancy is present in the later months; (*ii*) where the abdominal wall tissues are weak, particularly as the result of stretching from repeated pregnancies.

In Cases of Visceral Lesion.

Heart.—Advanced cardiac disease negatives an operation. Operation may have to be undertaken for strangulation as a last resort.

Lungs.—Any advanced pulmonary lesion. (*i*) A general anæsthetic is contraindicated, although a local one might be used. (*ii*) Cough produces a liability for the return of the hernia.

Kidneys.—Any advanced disease of the kidneys.

Liver.—Especially when ascites is present.

Some General Conditions.

Obesity.—Unless reduction of the fat can be brought about.

Ptosis of the abdominal organs in any marked degree.

Dermatitis, until this is cured by proper treatment.

CERTAIN TYPES OF HERNIA ARE UNSUITABLE.

1. *Inguinal Hernia.*—A largish inguinal hernia with feeble abdominal walls, and with much dilatation of inguinal apertures, is very unlikely to be "cured" by operation. It may be controlled by proper truss pressure, and by this the danger and discomfort of the hernia will diminish most appreciably. An operation then may place the patient in complete safety, and enable a light efficient truss to be worn with comfort so as to prevent recurrence.

An inguinal hernia which has recurred is very unlikely to be cured by operation, and a suitable truss is then advisable.

2. *Femoral Hernia.*—A femoral hernia of a large size is more difficult of cure than an inguinal. It is well again to try to obtain control of it by a truss, and subsequently to consider operation, with a view, not perhaps of cure, but of rendering the wearing of a proper truss efficient and safe.

A femoral hernia which has recurred is still more unlikely to be cured by operation, and a suitable truss is then advisable.

3. *Umbilical Hernia.*—(*a*) Infantile acquired: There is a great tendency for these small umbilical herniæ in infants to become cured by natural means. Therefore operation is not necessary before, say, 5 years of age. (*b*) Adult acquired: When there is present a large umbilical hernia in an obese woman, the question of operation is a serious one. It must always be remembered that there may not be sufficient room within the abdominal cavity for the contents of the sac. Cure of such herniæ by operation is most doubtful, but operation may make the condition such as to allow the wearing of a proper truss with comfort and safety.

4. *An Irreducible Hernia.*—There is no doubt that operation which allows of reduction of the contents of the hernial sac is ideal, but two points must always be very carefully considered: (*i*) Can all the contents find room within the abdomen? (*ii*) Will the operation permit of a truss being discarded?

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Discussion on Indications for the Induction of Abortion.

By THOMAS WATTS EDEN, M.D.

(*British Med. Jour.*, Aug. 7, 1926, p. 237.)

It has never been possible to lay down strict rules as to the conditions under which abortion should be induced. Each case deserves consideration on its merits. It may at times be right to terminate pregnancy, even if the mother is not suffering from any condition which could strictly speaking be called disease, but as a rule when we advise the induction of abortion it is for some definite morbid condition which can be classed as disease. We should be prepared to terminate pregnancy in the early months whenever there is active pulmonary phthisis, except in the case of patients who are obviously dying; in cases of healed or arrested phthisis the whole circumstances should be reviewed in consultation with a physician before coming to any decision.

To women suffering from chronic nephritis pregnancy is always attended by certain very definite risks; breakdown of the renal function may occur leading to uræmic convulsions; an intercurrent attack of acute nephritis may supervene and supposing these complications occur and are survived, the working capacity of the damaged organs will be permanently reduced.

The fœtal risks are very heavy: probably not more than 60 per cent. of the children survive, death being due partly to prematurity and partly to the results of transplacental intoxication.

Notwithstanding these risks, it is possible for a woman with chronic nephritis to survive the ordeal of repeated pregnancy, and to produce a fair proportion of children who survive.

The hydræmic type, which is characterised clinically by dropsy, and in which the renal difficulty is in the passage of salt and water, is much more serious from our present point of view than the azotæmic type, in which there is no dropsy, but slowly progressive cardiovascular and retinal changes, and in which the renal difficulty is in the excretion of the waste products of metabolism.

Bacillus coli infection of the urinary tract in its subacute form does not lead to serious developments during pregnancy, although it is sometimes the cause of an acute outbreak of fever during the early puerperium which may closely resemble the onset of puerperal sepsis.

Diabetes Mellitus.—Although in the past we have regarded it as one of the gravest intercurrent diseases in pregnancy, with the resources of insulin treatment at our disposal its risks have been very greatly reduced, though not entirely eliminated.

The detection of sugar in the urine is not enough of itself to establish a diagnosis of diabetes. Glycosuria and lactosuria are not uncommon in pregnancy; they are not accompanied by an increase in the percentage of blood sugar, nor are they accompanied by the characteristic symptoms of diabetes, such as polyuria, thirst and wasting. A case of simple glycosuria is always amenable to dietetic treatment, and never forms an indication for abortion.

Valvular disease of the heart seldom calls for induction of abortion. A young woman with a well compensated valvular lesion will, as a rule, pass through one, or possibly two, pregnancies without suffering serious inconvenience. Repeated pregnancies, especially if they follow quickly upon one another, undoubtedly damage the heart and reduce the patient's expectation of life.

There are two types of case in which it may be right to induce abortion (1) the woman who in the early months of pregnancy shows signs of failure of compensation; (2) the woman in whom a previous pregnancy led to a serious cardiac breakdown.

Dr. Eden stated that he had terminated pregnancy on the advice of a psychiatric physician in one of the following sets of circumstances: (1) the patient had recovered from a previous attack of puerperal insanity; (2) the patient was what is called a "border-line" case, and had a bad family history. Such cases as these are pre-eminently suitable for team work, general practitioners or obstetric surgeons should not either alone or together assume the responsibilty for a decision. The whole of the circumstances of the case should be reviewed by the general practitioner, the psychiatric physician, and the obstetric surgeon in company.

Chorea is, as a rule, amenable to simple management by complete rest in bed (in a room apart), careful feeding, and the administration of arsenic. Occasionally severe cases are encountered, these are often obdurate, and it may be that termination of pregnancy may now and then be necessary in the pyrexial cases. In all others, no matter how severe the clonic spasm may be, induction of abortion need not be considered.

The obstetric indications are few and relatively unimportant. Toxæmic vomiting is that form of persistent vomiting in early pregnancy which is accompanied by definite signs of toxæmia, such as a heavy albuminuria, a raised blood pressure, pyrexia, and wasting; it sometimes proves to be incurable by medical means, and must then be arrested by terminating the pregnancy.

Toxæmic vomiting is rare, but other forms of hyperemesis are fairly common and are always amenable to medical treatment. The commonest form is the functional case which can be cured by segregation or simply by removal from home surroundings to the healthier moral atmosphere of a hospital ward. Induction of abortion is not to be contemplated in these cases which can be distinguished by the absence of the signs of toxæmic vomiting.

Vesicular mole, when diagnosed, is an invariable indication for induction of abortion. A presumptive diagnosis can be made from the syndrome which is fairly characteristic—namely, hæmorrhage, usually slight and continuous, over-enlargement of the uterus, absence of the physical signs which indicate a fœtus in the uterine cavity, and a characteristic semi-solid consistence of the uterus. If all these signs are present, the case is either one of vesicular mole or of a dead ovum with retained hæmorrhage. The treatment in either case is induction of abortion, and the circumstances are eminently suitable for the castor oil and quinine method of induction.

Missed Abortion.—The retention of a dead early ovum in the uterus is as a rule easily diagnosed, when an interval has elapsed which is sufficient to allow of shrinkage of the uterus.

Sooner or later the ovum will be spontaneously expelled and it very rarely becomes infected. It is, however, a source of annoyance and suspense to the patient. Here also the castor oil and quinine method is usually effectual.

Dr. Eden said that very free hæmorrhage in the early months of pregnancy does not, in all cases, result in abortion; we should never be in a hurry to interfere with a threatened abortion because it is attended at the onset by severe bleeding. Persistence of bleeding is of more serious import for the life of the ovum than an initial smart hæmorrhage.

Dr. A. Louis McIlroy dealt with three aspects of the question—the legal, the ethical and the therapeutic.

The legal aspect is that induction of abortion is always against the interest of the State, therefore legislative measures and precautions have been taken to prevent its performance except in cases of medical necessity. It is a criminal offence. The practitioner should make sure of his ground when confronted with a patient who is desirous of obtaining an interruption of her pregnancy. In all cases whenever possible he should secure a second opinion.

No social or economic interests apart from the medical needs of the case should be taken into account. We should not be influenced by any likelihood of defect in the character of the offspring. If the completion of gestation is undesirable for medical reasons, we should urge the avoidance of subsequent pregnancies, and the necessity for abortion at future dates would therefore be eliminated. If this course is impossible, the question of sterilizing the patient has to be discussed, and in some cases sterilization is the only course to be adopted.

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Reviews.

THE PRACTICAL MEDICINE SERIES: 1926 SERIES. —Edited by G. H. Weaver, M.D., and L. Brown, M.D. and others. Chicago: The Year Book Publishers, 1926. Pp. 738. Price, $3.00.

THE 1926 volume contains four parts:—

1. Infectious Diseases and Endocrinology.
2. Diseases of the Chest.
3. Diseases of the Blood and Blood-making Organs.
4. Diseases of the Gastro-Intestinal Tract.

Each of these parts is compiled by a separate editor, himself an expert on the subject he reviews.

In the Infectious Diseases' section recent advances in our knowledge of the exanthemata, encephalitis and meningitis are fully dealt with. In an interesting article it is shown how the national delicacy of the Americans—ice-cream—may broadcast scarlet fever. Under malaria the work done in the south of the United States is reviewed.

The abstracts of articles on endocrinology are full of useful information, goitre being dealt with at full length.

Under diseases of the chest, pulmonary tuberculosis receives adequate consideration.

In the third section—the anæmias and leukæmias—the diseases of the heart and blood vessels and kidneys are dealt with *seriatim*. The articles on heart disease are very valuable. Writing of the electrocardiograph in an article by Price in the *Practitioner*, the following summary of its usefulness is given. "It is the most precise means of investigating the functional efficiency of the myocardium itself. It gives fuller information in the vast majority of cases of cardiac disorders. This information is important in most cases and not infrequently it is indispensable".

In the fourth section there are many interesting articles abstracted which should be of value to both the surgeon and the physician. The articles on tropical medicine practically exclude the work done outside the American continent.

For a resumé of the progress made in medicine during the last two or three years in subjects which are being intensively studied in the United States this volume is to be highly recommended.

A MANUAL OF NORMAL PHYSICAL SIGNS.—By Wyndham B. Blanton, M.A., M.D. St. Louis: C. V. Mosby Company, 1926. Pp. 215. Price, $2.50.

IN most text-books on physical signs which come into the hands of the student the normal signs are given side by side with the pathological signs. This arrangement is liable to cause confusion in the mind of the student not familiar with the subject.

In this book normal signs only are summarised and in a few instances explained and discussed. There is no reference to signs of disease, but abnormalities—not necessarily associated with disease—are included. For the most part the author has adhered to a tabular arrangement for the sake of clarity and brevity.

This is a book that one would like to see in the hands of every second-year student. Twelve hours or so spent in intelligent assimilation of the contents would lay a foundation on which he could build for the rest of his medical career.

THE NATURAL PROCESS OF HEALING IN PULMONARY TUBERCULOSIS.—By Marc Jaquerod, M.D. Translated by J. D. Sinclair. London: Baillière, Tindall & Cox, 1926. Pp. 108. Plates 35. With 60 X-Ray figures. Price, 6s. net.

THIS excellent little work is profusely illustrated with radiographs, and for those who wish to learn to recognise the condition and the progress of the tuberculous lung by this method the book is to be highly recommended.

The author writes from a wide experience and some of his sayings are very illuminating. One such passage may be quoted. "In acute affections (typhoid fever for instance) the cure of the disease precedes convalescence. It is when the patient arrives at a state of exhaustion that his lesions heal and his general condition begins to improve. In pulmonary tuberculosis on the contrary, convalescence often precedes the cure of the local disease. The general condition may be excellent, while the lesions are still in full activity. Patients may be misled by this fact, and so endanger their prospects of cure. It is by being guided by the state of the lesions that it is possible to decide that the disease is cured."

Some thirty-one typical cases are described and radiographic photographs are given of each.

Great stress is laid upon the necessity of sufficient length of treatment; two years being given as the minimum.

Artificial pneumothorax is recommended in many cases whose "moral energy" prevents their taking so long an interval away from their work. The *conclusions* wind up as follows:—"As for ex-tubercular patients, they will do well to engrave on their memories the words of one of the greatest biologists of the day: 'Life is the maintenance of a constantly menaced equilibrium.' They will understand that what is true for healthy people applies with much more force to those who have once had this equilibrium seriously endangered, and have had the good fortune to see it re-established."

THE BEAUMONT FOUNDATION LECTURES. SERIES NO. 4. THE THYROID GLAND.—By Charles H. Mayo and Henry W. Plummer. St. Louis: The C. V. Mosby Company, 1926. Pp. 83. Price, $1.75.

THE subject-matter of this excellent book was delivered as the *Beaumont Foundation Lectures* (Series No. 4) under the auspices of the Wane County Medical Society, Detroit, Michigan, in 1925. It contains a complete resumé of the diseases of the thyroid gland, including a history of the literature on the subject, their geographical distribution, the anatomy and physiology and development of the thyroid gland, with studies in its biological chemistry and development.

The experience of both the authors in thyroid disease is indeed unique. They had an opportunity of studying over 22,000 cases of disease of this organism in all its phases during a period of 33 years. The pronouncements made in the book may, therefore, rightly claim to be authoritative.

The chapter on the etiology of goitre and the development of the thyroid is a very interesting study and the authors have ably discussed the various causation theories, chemical and bacteriological. The chapter on the parathyroid glands is well written and up to date. The hyper-thyroid states with their main clinical manifestations have received careful attention and this section will amply repay perusal. It gives us great pleasure to recommend this book to medical readers.

J. P. B.

ORTHOPÆDIC SURGERY.—By W. A. Cochrane, M.B., Ch.B., F.R.C.S.E. Edinburgh: E. & S. Livingstone, 1926. Pp. 528 with 504 illustrations. Price, Rs. 15-12 net. Obtainable from Messrs. Butterworth & Co. (India), Ltd., Calcutta.

"THIS book is designed to give the student an understanding of the scope, principles and essential details of the speciality of the surgery of the locomotory apparatus in relation to the study of pathology and general medicine and surgery."

We consider that in this object the author has been unusually successful. The book is divided into two parts, the first part consisting of 87 pages devoted to the study of bodily mechanics and the results and treatment of faulty posture. This portion of the book is based on the author's experience as clinical assistant to Dr. J. E. Goldthwart of Boston, U. S. A.

Whether as a result of osteopathy and the other weird cults so prevalent in the U. S. A., more attention seems to have been devoted to this subject than in England where it has been left largely to the Eugene Sandow

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and similar institutes of physical training. The importance of this question may be judged from the fact that out of 746 students entering Harvard University only 12.5 per cent. were found to use their bodies on good mechanical lines. In this section the author makes out a very strong case for physical education with reference to preventive medicine, and this first part might well be printed in separate pamphlet form and placed in the hands of all school medical officers and of those responsible for education. At the leading American universities the students are graded and physical education under a Professor of Physical Education insisted upon. They recognise that it is not worth while giving intellectual training to physical inefficients. Some day perhaps the Calcutta University will recognise the same fact, and will insist on physical efficiency in candidates for the matriculation examination. This part finishes with a detailed description of exercises and treatment of faulty posture.

The second part is devoted to orthopædic surgery as ordinarily understood. The whole field is well covered, and many rare conditions included. Each section is preceded by a review of the anatomical and functional considerations of the part concerned. The clinical descriptions are concise and sufficient, while the treatment is set out in detail, an important point, for in no section of surgery is attention to minute detail more important.

Only fractures in the region of joints are included, but these are described fully. For treatment, plaster of Paris is preferred to other splints. In treating joint affections the author emphasizes the necessity at the outset of deciding whether the ultimate aim of treatment is to result in ankylosis or in movement, and of immobilising the joint in the position of optimum function. This is not always the same for the two end results.

We can strongly recommend this book to all surgeons and medical practitioners.

PEDIATRICS.—By various authors. Edited by Isaac A. Abt, M.D. London and Philadelphia: W. B. Saunders Company, Ltd. Volume VIII. Pp. 1102 plus 388 illustrations and Desk Index to the entire work. Price, per set, cloth, £18 net.

THIS is the eighth and last volume of this great treatise on children's diseases. Fifteen experts have contributed to the volume, all of them being Americans, and most of them hailing from Chicago.

This volume maintains the same high standard as its predecessors. It deals with diseases of the skin, ear and eye: there is a chapter on hospitals, one on medico-legal work, one on tumours, one on encephalitis and one on animal parasites.

Skin diseases are classified according to cause when this is known. The article on hospitals for children is very complete; large numbers of plans of actual hospitals are given. Many of these are on lines which cannot be followed in this country, as the offices and administrative rooms occupy a large proportion of the buildings, and it would be interesting to know the cost of building and maintenance in some of the typical American hospitals. In India we are severely restricted by considerations of cost, so that American standards are quite unattainable.

It is quite impossible to review in detail all the sections of this volume. Obviously a great effort has been made to cover the whole range of children's diseases in the eight handsome volumes which make up the work, which will be welcomed as a valuable book of reference. The cost of the set is £18, so that the average practitioner can hardly hope to add it to his library.

HISTOLOGICAL TECHNIQUE.—By H. M. Carleton, M.A., B.Sc., D. Phil. Bombay, Oxford University Press, and Constable & Co., 1926. Pp. XV plus 398. Price, 16s. net.

THE object of this book is to give in as compact a form as possible all the details necessary for the histological examination of normal tissues and tissues which have undergone morbid change. The author would appear to have gone a little beyond his original intention—if this is reflected by the name he has applied to the book—and has described the technique for the examination of certain body fluids and dejecta for various pathogenic organisms.

In order to make clear the necessity for many of the steps that are taken in the fixation and preservation of morbid tissues, a detailed description of the cell as a structural and as a physico-chemical entity has been given. Part II consists of a description of various methods of fixation and section cutting and details of various staining methods. As the staining methods that have been employed are so numerous the author has not attempted to give a detailed description of every staining method, but has confined himself to a detailed description of "type" methods; this part of the book has been written in collaboration with Mr. F. Haynes. In Part III the author gives details of accessory methods, such as dark-ground illumination and vital staining. Part IV is devoted to the description of special histology; under a number of headings are given the methods which are suitable for each particular organ or tissue. The last part of the book is devoted to describing methods of demonstrating various histo-pathological processes and for the identification of various pathogenic micro-organisms.

This book meets a long-felt want. Much of the information which it gives is to be found elsewhere, but it is buried in large volumes on general pathology. The book is written so that the student can understand it and at the same time its simplicity does not irritate the experienced worker. One has little doubt that this book will find its way into every general pathological laboratory where the English language is spoken.

ANNALS OF THE PICKETT THOMSON RESEARCH LABORATORY.—Vol. II, No. 2, July 1926. London: Bailliere, Tindall & Cox. Pp. 175. Plates 40 (with 6 figures on each plate). Price 42s. net per annum. One volume per annum.

THIS number is for all practical purposes a monograph on the corynebacteria written by David and Robert Thomson. In addition there is a very short note on a Gram-negative organism isolated from certain cases of measles; this amounts to the conclusions on the work reported in the previous number of this volume. There is also a note by J. J. Thomson on the etiology of tuberculosis in relation to the satisfactory immunisation of cattle.

The article on the corynebacteria is a comprehensive one. There is a short account of the true diphtheria bacillus and of the various strains which have been isolated. The various diptheroids which have been described in the past are reviewed and a short account of each is given, together with the author's comments. This is followed by sections on the distribution of this group in nature and the pathological conditions with which they are associated. The various attempts that have been made to classify the diphtheroid bacilli and various difficulties that have arisen are reviewed. The article concludes with the author's suggestions for their classification with the aid of microphotography. The most important part of the whole number is the 38 excellent plates which include about 300 excellently reproduced photographs.

Annual Report.

ANNUAL REPORT OF THE HEALTH OFFICER, RANGOON, 1925. ANNUAL REPORT OF THE CONTAGIOUS DISEASES HOSPITAL AND THE MUNICIPAL OBSERVATION HOSPITAL, RANGOON, 1925. BY K. R. DALAL, L.M. & S., D.T.M., D.P.H., HEALTH OFFICER, RANGOON CORPORATION.

As usual, Dr. Dalal's annual reports are of considerable interest. The estimated population of Rangoon in

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1925 was 364,505, the birth-rate 18.76 and the death-rate (corrected for estimated population) 33.90 per mille. Still-births numbered 7.21 per mille of all births recorded, and the chief reason ascribed is the prevalence of venereal diseases.

Next to New York, Rangoon is the largest emigration and immigration port in the world, and its problems are especially concerned with a changing and migratory population. The low annual birth-rate recorded is due to several causes; (*a*) the excess of male immigrants over females, thus of the total immigrants in 1925, males numbered 2,99,022 as against only 31,190 females: (*b*) the fact that—as is usual in the big Indian cities—many married women go to their homes in the mofussil for their confinement; (*c*) defective registration of births. Infant mortality during the year was 351.85 per mille of births, and of 6,494 infants born in Rangoon Town 1,757 died within the first year of life, 637 of them within the first month. Premature birth, malnutrition and convulsions, and bronchitis and pneumonia appear to be the chief causes of the infant mortality; and there is a direct correlation between low economic conditions, bad and insanitary housing, and a high infantile mortality rate. Qualified midwives attended 48 per cent. of the births registered in the city during the year—a not inconsiderable figure.

Of the chief diseases plague shewed an increase to 724 cases as against 554 in the preceding year, with a case mortality of 91.16 per cent. Of 38,734 rats examined at the Corporation Laboratory, 119 were found to be infected, and the months of March and May shewed the highest incidence of plague among the rats of the city. The human disease was at its height in April, and Hindus were especially affected. The usual measures were taken; 1,077 persons were inoculated, 32,802 houses cleaned and 2,935 disinfected. Eighteen permanent and 8 temporary gangs were engaged in site-cleaning and intensive ratting in *kutcha* areas, and in all 604,250 rats were destroyed.

Cholera was unimportant during the year; 82 cases as against 167 in 1924. Small-pox, however, assumed epidemic proportions during the first 5 months of the year, and 1,956 cases occurred, of which 228 were imported. The small-pox death-rate per mille was 1.83 as against an average of 0.41 for the previous 5 years. The epidemic reached its height in March, when 741 cases occurred, and an extra staff of 12 vaccinators was engaged. Vaccinations totalled 127,111, of which 32,345 were carried out during February.

Influenza was unimportant during the year, whilst a definite increase in incidence of enteric fever occurred. Diarrhœa and dysentery were especially prevalent, and investigations were carried out to ascertain why. The water-supply from the Hlawga Lake was proved not to be responsible, whilst samples of milk, fish, fruit and lettuce from various sources were examined with negative results. Wells and tanks however constitute an important part of the water-supply and these become infected in the early rains, whilst flies and the insanitary state of milkstalls and foodshops contribute. The greater part of the city is still dependent on tub latrines for its conservancy, and although the tubs are emptied daily they are in a grossly insanitary state.

Tuberculosis shewed a definite increase, with a high incidence amongst Buddhists. Other respiratory diseases accounted for a mortality of 6.78 per mille, and these diseases are especially prevalent among the population engaged in river traffic, poorly nourished, ill-clad, and often working in inclement weather. Beriberi caused 60 deaths, of which 50 occurred among Hindus; 6 cases of epidemic dropsy with one death occurred among the shipwrecked crew of a native craft wrecked at sea and picked up and landed at Rangoon by the S.S. *Ellora*. Twelve deaths from kala-azar were reported.

Turning to the hospitals and dispensaries, 2,731 cases were admitted to the Contagious Diseases and Observation Hospitals. The daily average outpatient attendance at the Dalla Dispensary was 60.5, at the Kanaungto Dispensary 63.0, at the Theinbyu Dispensary 97.0, and at the Forest Road Dispensary 48.2. A proposal to attach a small dispensary to each registration and vaccination station in the town was negatived, each case for a new dispensary being thought to require consideration on its own merits. There are eight such registration and vaccination stations in the town.

The Corporation Laboratory carried out 39,521 bacteriological and 239 chemical examinations during the year, and a very large amount of foodstuffs including 27,328 bundles of jerked meat was condemned and destroyed. The annual meat show was held on Xmas Eve and monetary prizes to the amount of Rs. 650 awarded. An annual cattle show was also held during the same month, and prizes totalling Rs. 1,690 were awarded. The Burma Agricultural Department awarded a special prize for the best Burma-bred sheep. Reclamation works are in progress at Theinbyu and Dufferin Garden, and the work at Saline Monastery was completed.

In his concluding general section, Dr. Dalal has remarks of general interest to make on the special public health problems of Rangoon:—

The principal causes of the insanitary conditions which maintain the death and sickness rate at a high level in our city, excluding the annual recrudescence of such epidemic diseases as plague, cholera and small-pox are (1) the absence of a wholesome and abundant pipe water-supply in some parts of the town and insufficient supply in the rest; (2) absence of proper drains and sewers; (3) the existence of the large number of tub latrines, (4) the extreme over-crowding of houses in the town; and (5) the high density of population per acre.

The bacteriological reports on the purity of our Hlawga Lake water have ever been a source of grave anxiety to the officers concerned, as this lake water is being distributed to the public without any preliminary treatment for its purification.

The total count of micro-organisms found present in one c.c. of the sample examined, has always given too high a figure for good potable water. Occasionally the results have revealed the presence of micro-organisms of non-resistant types indicating some recent pollution of water by human or animal fæcal matter. So far no disastrous results have followed the presence of such micro-organisms, but such a fortuitous event may only be due to the pollution of the said water at the time by some innocuous excreta. Disastrous results would certainly follow if the chance pollution were to take place by some specific pollution as from a case of enteric, cholera or some other waterborne diseases. Besides the catchment area and the lake itself are so easily accessible to passers-by, trespassers and poachers that a tremendous risk is taken every day against any chance contamination of the water with specific and non-specific pollutions. It is impossible to keep stray men and animals from entering the lake area.

With the existence of the new cantonment area within easy reach of the Hlawga Lakes and the concomitant growth of the village and traffic near by this danger would soon become a more potential one.

The use of chlorine is the cheapest method of purifying large quantities of water for our town supply, the most efficient process by which the removal of bacteria could be accomplished, and the most economical in its working cost. Much advance has been made in the chlorination plant where liquid chlorine gas can be regulated to the minutest degree to suit whatever percentage is required for any particular water.

I would therefore strongly recommend that early steps be taken to instal an efficient chlorination plant either near Pegu Pumping Station or the new reservoir to render our lake water-supply epidemiologically safe.

As for the quantity of water available, unless some immediate steps are taken to explore new and practicable avenues to secure a wholesome and ample supply of water, the city will have to face in the very near future problems of very grave importance. Hardly one half

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of the present population has been supplied with pipe water, the remaining having been left to the tender mercies of wells, shallow, deep or tube. The town is being extended far and wide. New areas have been reclaimed and laid out, new workshops, factories and extensions are going on *pari-passu* and the consumption and demand for water has greatly outgrown the limited supply at our disposal.

There is such a free communication of our town by rail, river and road with other infected districts of the Province that almost all the cases of cholera first noticed in our town, are imported from outside and it needs the utmost vigilance on the part of the Health Department to control and prevent the outbreak of this disease into more serious proportions in the city. But the standing menace of such an unfortunate incident in the future is there all the same so long as the whole town is not supplied with wholesome and abundant pipe water.

Infantile Mortality.—Practically speaking in our town for every 3 babies born, one dies before it reaches the first year of life.

Poverty, ignorance, insanitary dwellings and injudicious infant feeding are the principal causes of high infantile mortality in every city, but not a little is contributed by the mother before the child is born, as the health and life of the new-born infant very greatly depend upon the health, care and attendance given to the mother before, during and after confinement.

The measures for the reduction of infant mortality group themselves under maternity and child welfare centres which should comprise the following:—

(1) Home visiting by lady health visitors for finding out prospective mothers, cases of sickness among mothers and infants, enquiry into the condition of the new-born infants and instructions by homely talk on sanitation, cleanliness, domestic hygiene and breast-feeding.

(2) Maternity homes and shelters for the poor.

(3) Free attendance by qualified midwives on confinements at home of the poor of the purdah-nashin women who would not go to the shelter during the lying-in period.

(4) Free provision of necessaries and comforts.

(5) Infant milk depôts for cheap or free distribution of pure milk to infants and children of the poor up to the age of 18 months.

(6) Infant welfare centres where the sick infants of the poor are admitted and treated.

(7) Antenatal clinics to give proper care and treatment to the expectant mother.

The Society for the Promotion of Infant Welfare in Rangoon under the fostering care and able guidance of Lady Giles has been carrying on much good work in Rangoon, but much yet remains to be done.

It has been a matter of great regret that our city does not possess a single maternity and infant welfare clinic where prospective mothers may receive the care and attendance needed during the most critical period of their life and where antenatal care of the infant to be born may be taken.

Plague.—During every year of the epidemic, it has been observed that plague first makes its appearance in the *kutcha* quarters of the town such as Kemmendine, Theinbyu and Pazundaung at both ends of the land and taking root in these quarters it gradually spreads more and more towards the centre of the town where it at last exhausts itself for the year in this *pucca* area. As is well known plague, rodents and rubbish are intimately connected to each other. Theoretically, therefore, if we could exclude the latter two, we can exclude plague automatically.

There are large tracts of land beyond public roadways and back drainage spaces which can never be attended to by our present conservancy staff. Similarly all private lands leased out to poor tenants who have built structures 4 feet off the site. All such places are usually found seething with filth and rubbish of every description. Action certainly could be taken under the Act against the owners or occupiers of these lands, but the enormous amount of time and energy wasted in issuing notices, frequent inspections and prosecutions of the parties concerned, who are mostly extremely poor, is hardly commensurate with the result obtained. The sense of health conscience has not as yet been awakened in the general public and it should form part of our duty for the present to undertake removal of all filth and rubbish from all such lands. It would obviously necessitate a big increase in our conservancy staff but the results so far achieved, even by the entertainment of eight extra gangs during the year under report in not only preventing a much apprehended severe incidence of plague epidemic but reducing the number of cases of plague much below the normal years even, justify our incurring any expenditure however heavy in this connection.

Small-pox.—The prevalence of epidemic small-pox has unfortunately become an event of perennial occurrence in our city. Year after year the same woeful tale is told of the sad havoc caused by this disease. Every few years a more virulent wave of the epidemic swoops over the town claiming a heavier toll of human life than the usual. The conditions under which the large majority of the labouring class live in the town, the extreme over-crowding in the living rooms and the very large number of the unprotected people in the population afford excellent field for this disease to spread like wildfire. The condition of our city is unique. The migratory population of the town is enormous. Our city next to New York is the largest immigration port in the world. The permanent population of the town is hardly one-third of the total.

Moreover this huge labouring population is forced by circumstances to live in over-crowded, ill-ventilated, insanitary houses, huts and hovels, and the ignorance, poverty and misery inseparable from these unfortunate people only render them more vulnerable to any infectious or contagious disease. There will be few towns in the East or West where vaccination propaganda is carried out to such an extent as in our town.

Another great factor in the annual recrudescence of small-pox in our city is the very large number of cases imported into the town.

Had it not been for the brilliant success achieved by the intensive campaign of vaccination and re-vaccination that was launched during the year under report wherein over 1,27,111 persons were vaccinated in spite of the fact that we were greatly handicapped in the absence of any Act for compulsory re-vaccination, the last serious epidemic would have assumed more virulent and widespread proportions and entailed untold suffering, misery and death.

One of the most important functions of a Health Officer is the intelligent anticipation of the probable course of an impending outbreak of an epidemic disease. The history of small-pox in our town has revealed one outstanding feature of the course of events that follow its annual recrudescence. As noted in the Annual Report for the year 1923, a periodic wave of the epidemic of small-pox of greater virulence breaks out every fourth year or thereabouts preceded and followed by an outbreak of moderate intensity. The first signs of such an impending epidemic were noted in the month of November 1924, and anticipating this periodic wave to occur in the year under report, precautionary measures were taken in time and sanction was obtained in December 1924 to entertain a large staff of temporary vaccinators and an intensive campaign of vaccination and re-vaccination of all the labouring population of the town, which by the way is the predominant one not only in number but in the suffering and spread of the disease, was started with the result that a very large portion of the population constantly exposed to infection was protected in time and further spread of the disease was rapidly checked by the end of March, within 3 months of its first outbreak. The last wave of the epidemic was also of the classical type with a heavy case mortality rate of 31.47 per cent.

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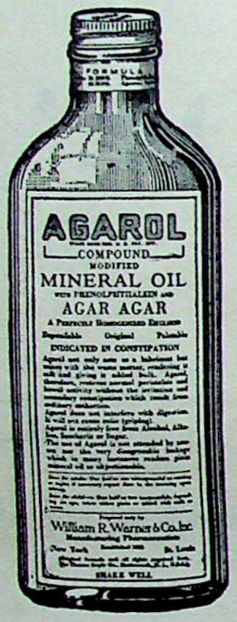

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I need hardly draw attention once again to the very grave risk involved in allowing unprotected immigrants to enter the Province and the danger of infection from these immigrants. To my mind the only rational procedure would be to pass an Act making it obligatory to vaccinate every labouring hand before he is allowed to enter the Province. Under the existing conditions it is practically hopeless to protect the town against the visitations of this annual scourge as whatever the precautions taken or other preventive measures adopted such as isolation, segregation, disinfection, etc., they will be of very little avail under the prevailing conditions in the East and are no substitutes for vaccination.

Correspondence.

TROPICAL TYPHUS.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—The article on tropical typhus by Fletcher and Lesslar in the *Indian Medical Gazette* for November 1926 is of great interest.

While I was Agency Surgeon in Gilgit I saw a number of cases of fever which gave me food for thought. When I first made the acquaintance of the inhabitants of the Agency I asked if typhus was prevalent and was told that it was unknown. I very soon came to the conclusion that it was unknown because it was undiagnosed. I saw enough cases of a disease which was clinically typhus to convince me that it was typhus modified, so I thought, by endemicity and partial immunity. Two absolutely typical cases in British officers confirmed to my own satisfaction the diagnosis of the cases in Indians.

In the cases of the British officers there was no opportunity of spread among Europeans, for in one case all precautions were immediately taken and in the other, except myself, no other Europeans were within 50 miles. It is true that Indian servants were to some extent exposed to possible infection, but none of them developed any symptoms.

One other case occurred in a non-native of the Agency. The patient was an Indian gentleman whom I did not see during the acute stage of his illness but of whom I had daily reports. I have no doubt that he too suffered from the same disease.

In the case of the British officers the disease was perfectly typical, and though both were fairly seriously ill for a time, convalescence was rapid and there were no complications or sequelæ. The Indian case was more prolonged and he subsequently suffered from boils and loss of hair with considerable debility for some time.

There was never any epidemic. This I attributed to the fact that the Europeans and the Indians were in no way protected, whereas the natives of the Agency had contracted a certain resistance to infection.

Of course in a practice such as the Gilgit Agency only a proportion of fever cases is ever seen by the Agency Surgeon or even by subordinate medical officers, so the actual frequency of the condition above referred to is unknown.

It is at least possible that the cases I refer to were distinct from typhus proper, and of the nature of those described by Drs. Fletcher and Lesslar.

Rats, lice and ticks abound in the Agency, though in none of my cases was there a history of bite. All my cases were seen during the summer months.

May I, at the risk of unpopularity with the compilers and readers (if any) of statistics, put in a plea for more interest in "fevers"? A satisfactory "return" must contain a list of surgical operations—successful or otherwise. Nobody worries about the countless cases daily recorded in the out-patient register and treated (save the mark) with a dose of quinine or magnesia. Might we not only advance our knowledge but also possibly save some unfortunates from the operation table if medical subordinates were encouraged to *diagnose* cases of "fever"?

I saw in Gilgit in the summer of 1925 two cases—Europeans—of a disease, which, though remarkably like typhoid, was, to my mind, definitely distinct. Notes of these cases I sent at the time to the Superintending Surgeon, Jammu and Kashmir State, and I believe they will be published shortly.—Yours, etc.,

LOUIS. H. L. MACKENZIE, MAJOR, I. M. S.
Civil Surgeon.

HAZARA, ABBOTTABAD, N. W. F.
15th December, 1926.

TREATMENT BY SUGGESTION.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—There is probably no subject within the four corners of "medicine" that is so consistently neglected, misunderstood and maligned in equal proportions as that of suggestion, hypnotism, mesmerism, Braidism, Couéism, or whatever name the particular critic prefers to apply to a most interesting branch of psycho-therapy. Broad dogmatic statements are made, usually by authorities who have no personal and practical knowledge of the matter with which they are dealing.

"Suggestion" is not the only sufferer in this regard. Looking back, we find that Harvey was abused, Simpson was adversely criticised, Laennec was laughed at, Lister was maligned; so the suggestion-*wala* is at least in good company.

As I write, there lies on my desk a ponderous volume (American) open at a chapter the heading of which is "Mental Disorders in Medico-Legal Relations," with the sub-title "Disorders of Consciousness."

Amongst other statements, the distinguished authors make themselves responsible for the following expression of opinion, in proof of the soundness of which they refrain from bringing forward any evidence whatever.

"It would be impossible for one under hypnotic influence to exert normal inhibitions against a suggested act, and such an act committed in hypnosis would have the quality of an irresistible impulse. Our knowledge regarding hypnotic states is almost entirely from laboratory experiment and clinical studies in non-forensic relations. In such observations it is difficult to arrange an experiment that would correspond to the requirements of an actual act having serious criminal importance." I think the fair minded man will agree that these statements practically antagonise one another, especially if the word "impossible" is substituted for "difficult" in the second statement. Seeing however, that it is quite possible to observe the action of the normal inhibitions at work even in the hypnotic state produced for curative purposes, we, whether as general practitioners or as medical jurists, can make up our minds on the subject after proper investigation. The complaint of the practitioner who uses suggestion in the course of his work is that the medical profession makes no effort at the proper investigation which the obtainable results will amply repay.

As an ounce of practice is more valuable than a ton of theory, a short description of a recent case sent to me for treatment by suggestion may give your readers "to think." A young woman aged about 20 was admitted to hospital for treatment of a non-specific vaginitis. The development of mental symptoms (attacks of violence, insomnia, etc.) drew attention to her previous history. Deserted by her husband, she had indulged in loose living, and finding the same remunerative, had become to all intents and purposes a prostitute.

Treated by suggestion, her mental and physical conditions improved very rapidly. She became cheerful, ate and slept well, became truthful and industrious. Deep hypnosis was easily induced on each occasion and post-hypnotic suggestions were carried out to the letter with one important and instructive exception. She had expressed her intention to go to a distant city. It was ascertained that she had arranged to occupy a flat in that city for the purpose of her business, and that several prospective clients were expecting her return at an

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early date. Any suggestion given to her in deep sleep, that she should not go to the city in question, that she should lead a moral life, that she should remain in the Home in which she was being treated during her convalescence, resulted in the production of an angry frown, an impatient movement, or a tendency to awaken. All other suggestions, tending to her physical and mental well-being were accepted and transformed into fact, the suggestion of moral reform being contrary to her express and expressed desires alone being rejected.

I could multiply such instances, e.g., in cases of dypsomania, drug taking, etc., where the patient at heart does not wish to be cured, suggestions are but temporarily accepted or are rejected, even in deep hypnosis, the induction of which is rare, and usually unnecessary. No thinking man who examines the matter will find it difficult to believe that "it would not be impossible for one under hypnotic influence to exert normal inhibitions against a suggested act," in cases where the suggested act, whether good or evil, was contrary to the subject's beliefs or prejudices, or inimical to his interests.

The old adage says that "a little knowledge is a dangerous thing." I think, Sir, that you will agree with me that no knowledge at all is very much more dangerous.—Yours, etc.,

WILLIAM NUNAN,
Police Surgeon, Bombay.

29th December, 1926.

THE TREATMENT OF SNAKE-BITE.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—Referring to Dr. Banerjee's letter in the October 1926 issue of the *Gazette*, I would refer him to Wall's book on the *Poisonous Terrestrial Snakes of India and Ceylon*, published by the Bombay Natural History Society, in which book the symptoms and treatment of snake poisoning are gone into very thoroughly. Dr. Banerjee's statement is quite correct that sloughing may be produced by the venom itself, but by the rubbing in of permanganate crystals the destruction of tissue is much greater and the production of sloughing not an uncertainty, while the wound resulting is much larger and takes longer to heal than if the venom injected had not been assisted by the caustic in its destructive effect. Let me quote Wall on this point: under medicinal preventive treatment he says "various agents are known to neutralise snake venom when mixed with it in a vessel, a chemical decomposition arising which robs the venom of its poisonous qualities. Such are permanganate of potash, chloride of gold, silver nitrate, the chloride and hypochlorite of lime, etc. When Fayrer (in 1869) first discovered that permanganate of potash possessed this property there was theoretically every reason to suppose that it would prove antidotal when introduced within the tissues holding the snake venom, but experiment proved otherwise. What is true of permanganate of potash is probably equally true of the other substances enumerated. Snake venom when once introduced into living tissues is locked up in them so tenaciously that it can only with great difficulty and then only imperfectly, be brought into chemical relationship with neutralising agents of this class.

Col. Bannerman has convincingly shown from a large series of experiments on living animals that permanganate is for all practical purposes of little, if any, avail. In these experiments, some of which I witnessed, the tissues were cut into after the injection of venom by a hypodermic syringe specially fitted on to the fangs of a Russell's viper, thoroughly opened up and permanganate was then (within a second or two) rubbed into the incised wounds. The circumstances were obviously far more favourable than could possibly ever obtain in a bitten subject in medical practice, yet the salt rarely reprieved the death sentence." This sounds convincing, being based on accurate scientific observation, and not on tradition.

As regards the depth of incision necessary, since in the vipers the poison fang is much longer than in the cobra and rarely exceeds half an inch even in the largest specimens of vipers * it is obvious that the indiscriminate infliction of incisions in various parts about the affected locality, and the great depths of some of these incisions, often down to bone, equally merits the stigma of bad practice as does the administration of alcohol in ophitoxæmia.—Yours, etc.,

J. E. LEONARD CHINAL,
M. D., D. T. M. (*Bengal*).

MONGHYR,
10th December, 1926.

QUININE UREA IN MALARIA.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—Referring to your note to my letter in the November 1926 issue of the *Gazette*, you appear to have missed my point when you state "in hydrophobia the use of any remedy which may be of value in heroic doses is legitimate." What I attempted to draw attention to was the safe use of such large doses of the quinine preparation mentioned without any harmful effects, and from this I naturally felt that there are other possible uses of quinine urea than its employment only as a local anæsthethic.

Then again Major Chopra states that quinine urea solutions are strongly acid and cannot be used subcutaneously, but are the other quinine salts used by the parenteral method any less acid? Quinine urea has lately been used in 1 per cent. solution intramuscularly in acute lumbago, and even into the gums for extraction of teeth; perhaps some day it will be found of use in certain cases of malaria, either intramuscularly or intravenously in proper dosage and solution.—Yours, etc.,

J. E. L. CHINAL,
M. D., D. T. M. (*Bengal*).

MONGHYR,
10th December, 1926.

INFANTILE CIRRHOSIS OF THE LIVER.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—With reference to the observations made by Dr. A. S. Vaidyanatha Iyer, in the *Indian Medical Gazette* for December 1926, regarding infantile cirrhosis of the liver, while thanking him very much for the valuable information given to the readers of the *Gazette*, may I request him to kindly enlighten me on the following doubtful points.

(1) Whether a post-mortem examination was made in any of the fatal cases, and if so the result of the microscropic examination of liver sections confirming the diagnosis of cirrhosis.

(2) Considering that rickets, a disease of metabolism, is due also to faulty digestion and assimilation of an unsuitable and deficient diet and as its manifestations are many and varied and not confined to the bones alone, and as it may also happen that the bone changes may be masked by other symptoms, and as the symptoms described by him closely resemble those of an ordinary case of rickets in its early stages—except jaundice as seen in the late stages of his cases—the other signs and symptoms, including the enlargement of liver and spleen being also met with in rickets, what are the distinguishing features of rickets and cirrhosis of the liver in their early stages? In this connection, I may also add that the age incidence of rickets is also the same as that found by him, the onset being generally after 6 months of age. Cases of infantile cirrhosis of the liver due to congenital syphilis or due to congenital obliteration of the bile ducts manifest symptoms of jaundice either from birth or immediately afterwards and they are invariably fatal. The cases cited by Dr. Iyer do not in any way conform to any of these conditions.

On reading over again the observations made by Dr. Iyer and also the particular line of treatment adopted, I am even lead to wonder whether some of his cases

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* *"The common snakes of India and Burma and how to recognise them"—W. H. Cogaly, Pioneer Press.*

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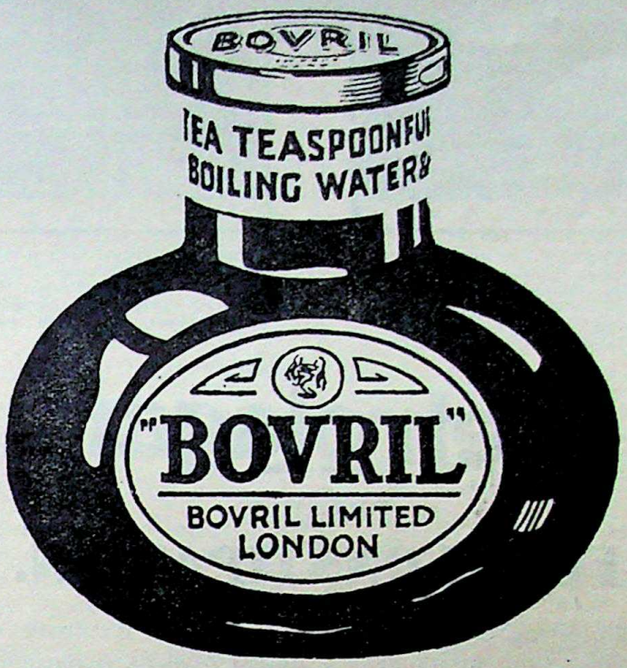

For Emergency Conditions

Bovril is known to the medical faculty as a rapid restorative. Its stimulating and strengthening effects are particularly useful because of the rapidity of its assimilation and of its resulting power to support the patient in case of threatened collapse.

Bovril is the concentrated essence of beef. It is a nutritive food as well as a valuable stimulant, and its body-building powers have been proved by independent scientific investigation to be from 10 to 20 times the amount taken.

BOVRIL

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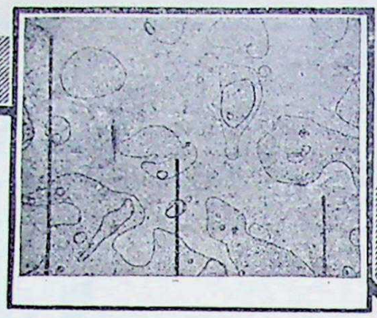
Micro-photograph of stool after Petrolagar administration, showing complete emulsification and thorough admixture with intestinal content.
(1) *Epithelial Cells*, (2) *Microscopic Oil Globule*, (3) *Agar-Agar Granule*, (4) *Faces*.



Micro-photograph of faces after administration of plain mineral oil, showing complete absence of emulsification: this explain why mineral oil always leaks.
(1) *Epithelial Cells*, (2) *Oil Globule*, (3) *Faces*.

Petrolagar

(DESHELL)

FOR CONSTIPATION.

THE micro - photographs clearly demonstrate the superiority of Petrolagar over ordinary liquid paraffin in the treatment of constipation. On the left the perfect admixture with the intestinal content obtained with Petrolagar is apparent; the other photograph, in which large unemulsified globules of oil are present, explains at a glance why plain mineral oil never has solved and never can solve the problem of constipation. It also shows why mineral oil leaks.

The drawbacks inseparable from the use of plain liquid medicinal paraffin are well known. Many patients cannot tolerate its insipidity; digestive disturbances sometimes occur; whilst thorough admixture with the intestinal content is seldom attained, with consequent leakage from the rectum.

Petrolagar contains 65% of purest mineral oil with a 10% Agar emulsifying agent, prepared from 1½% anhydrous agar, forming a perfectly stable, homogeneous and highly palatable emulsion.

There is no taste of oil, so that the most fastidious patients take the product readily. In the treatment of chronic constipation, Petrolagar gives results unobtainable by any other method and breaks the vicious circle set up by the habitual use of drastic purgatives. The medicinal paraffin is so finely divided that it is thoroughly disseminated throughout the fæcal mass, thus leakage is almost entirely eliminated; the agar-agar is specially prepared so as to yield on incubation in the intestinal tract many times its original bulk, forming a bland gelatinous mass which is completely and readily eliminated, acting indeed, as a soothing emollient to the inflamed intestinal mucosa.

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cannot possibly be ordinary cases of catarrhal jaundice occurring in infants.—Yours, etc.,

L. R. NARAYANA IYER,
Sub-Assistant Surgeon.

GOVERNMENT OPHTHALMIC HOSPITAL,
MADRAS, *26th December*, 1926.

BRITISH INCOME-TAX CLAIMS.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—May I draw the attention of your readers to the fact that the above claims for the financial year 1920-21, which is the first year for which they can be preferred, must be definitely lodged with the Inland Revenue authorities here by April 5th next. After that date these claims will become statute-barred.—Yours, etc.,

W. T. FRY,
13, *Buckingham Palace Gardens.*

LONDON, S. W. 1.
24th November, 1926.

EMETINE ADMINISTRATION.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—I have read with interest the article which appeared in your October 1926 number concerning paresis following emetine injections by Dr. B. D. Pal, M.B., B.S. I have treated not only amœbic dysentery cases but also many other kinds of intestinal disorders with emetine hydrochloride injection, and my experience of emetine injections is contrary to Dr. Pal's, as I do not follow his method of introducing this drug into the human system. First of all I would like to mention the drawbacks which emetine possesses; many patients tolerate only small doses which are not enough to bring about a complete cure. Larger amounts sufficient to effect complete eradication of the parasite produce marked tachycardia, vertigo and vomiting. To withstand this a weak patient has to be given cardiac stimulants before the emetine medication. Amongst other signs of its toxicity the following are mentioned; weakness of the muscles of mastication, deglutition and speech, paralysis of smooth muscle fibres and of the vaso-motor centre, with a fall of blood pressure and syncope. To avoid these toxic effects my method of emetine administration is as follows. I do not inject into the muscle fibres but give a first subcutaneous dose of gr. ½ in 20 m. of distilled water in the lower third of upper arm posteriorly; the second dose gr. ¼ in 20 m. of distilled water I give directly into the vein until I have given 6 grs. by the vein, preferably on an empty stomach and during the morning hours. I have experienced no such toxic symptoms as are reported by many and in particular by Dr. Pal.—Yours, etc.,

A. DAWSON, L.M.P.,
Medical Officer, Thonze.

15th December, 1926.

THE OPERATIVE TREATMENT OF FRACTURES.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—In his letter which was inspired by my article on the operative treatment of fractures in the September 1926 issue of the *Indian Medical Gazette*, Colonel Proctor accuses me of "ridiculing the present accepted methods of treating fractures." I have never ridiculed the present accepted methods of treating fractures; what I did ridicule was the practice of traumatising the tissues at the site of the fracture under anæsthetic, followed by the application of plaster of Paris. I am happy that Colonel Proctor has given me another opportunity of denouncing this obsolete folly and cruelty. Colonel Proctor's letter abounds in dogmatic and *ex-cathedra* statements. "Surgical opinion has long since crystallised out." "As far as India is concerned we may leave it at that." Leave it at what? At a method of treatment which was in use in the time of the Pharaohs? Such a practice has the respectability which only antiquity can confer, but none but the most unsophisticated can be expected to accept it as up to date. If Colonel Proctor will consult Professor Hey Groves's comprehensive work on the treatment of fractures he will find this very practice mentioned, only to be condemned. He will find that he is advised to wrap a piece of stick up in a number of layers of cloth, to fracture it, to displace the ends, and then to endeavour to replace them again. His lack of success will convince him of the futility of his attempts to "set" fractures by manipulations under an anæsthetic. He will find an excellent resumé of the whole subject in the latest edition of Rose and Carless's *Surgery*, a work available to every medical student. If he reads this, he will learn that it is possible to obtain results in the treatment of simple fractures without that deadly double offensive of gas and trauma. I am not for the moment discussing the operative treatment of fractures. I am meeting him on his own ground, in the province of the non-operative treatment of simple fractures. He will obtain (I trust) a firm grasp of the two great principles which underlie the modern treatment of simple fractures, namely relaxation of the muscles by flexion, and extension in the line of the limb by a weight sufficient to overcome the pull of the muscles. These principles have emerged solid and unassailable, fortified by the immense experience accumulated in the treatment of fractures in the Great War. He will find, if he will apply these methods, that it is possible to obtain almost perfect restitution of the form of the bone by the gentle but powerful operation of adequate extension combined with muscular relaxation. He will find that all this can be effected without the infliction of any trauma or without the administration of even a whiff of chloroform. He will find that the practice of which he is the champion has long since been consigned to the lumbar room of obsolete methods.

Now since I never willingly allow a misstatement to go by default, I must correct the various errors contained in Colonel Proctor's letter. No one—least of all myself—advocates the practice of leaving plates on the growing ends of bones. This is a misstatement and I challenge Colonel Proctor to quote anything that I have written in support of it. A large number of these fractures are above the line of growth; where they are not so the plates would of course be removed. I cannot say that I am greatly impressed by "the revolt against the general use of metallic sutures and plates." It is not dignified or logical to revolt against a method of treatment which is admirably successful in competent hands, because one naturally asks, was the revolt founded on a disastrous series of cases in the revolter's own practice. Let us hear the conclusion of the whole matter. If the surgeon's technique is not good enough to secure aseptic results, he should leave bone plating alone and rely on other methods. He should, however, be sure that these methods are really up-to-date before taking on himself the responsibility of criticising his brother. In conclusion I must express my regret for not replying earlier, but my attention has only just been drawn to Colonel Proctor's letter.—Yours, etc.,

H. HALLILAY,
LIEUT.-COLONEL, I.M.S.,
Civil Surgeon.

AMRITSAR,
3rd January, 1927.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—I expressly stated in my letter that I did not intend to enter into a controversy as to the merits of the operative treatment of fractures. Colonel Hallilay's letter makes it clear that he is not ridiculing present accepted methods of treatment. His article left myself and others with the impression that he was ridiculing all non-operative treatment. For that I think his unique literary style must be blamed.

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Had I not wished to avoid a controversy I should have enumerated the principles of flexion, extension, suspension, early active and passive movements, etc. Colonel Hallilay admits that by applying these methods it is possible to obtain almost perfect restitution of form and, I may add, of function. If so, why in season and out advocate plating? Surely this is argument enough for such a strong opponent of traumatism under an anæsthetic.

It was precisely because I was acquainted with these facts that I ventured to criticise Colonel Hallilay's article.

I expressly stated that his thesis was that "All fractures should be plated." He himself states "..... no one who is not hopelessly prejudiced can deny the overwhelming superiority of the method of open operation."

If I have misunderstood him, and his position is that open operation—not necessarily plating—is indicated in cases where these non-operative measures have failed, or where we know by experience they will fail, then I shall be glad to agree with him. I have however up to this letter found nothing in his writings or in his notes of cases to indicate this.

Colonel Hallilay assumes that the revolt against the general use of metallic sutures and plates is founded on disastrous results. It is nothing of the sort, and if he is acquainted with modern fracture literature he knows it. It is based on the fact that the chief contra-indication to operation is that it is not necessary. I ask your surgical readers to carefully study his skiagram 2. We may assume it is taken so as to show the maximum deformity. Is there any indication for plating this fracture in a child of seven? A perfect anatomical and functional result is even more certain without an operation. By the way, the word "revolt" is not mine but that of one of the greatest authorities on fractures. Colonel Hallilay takes me to task for accusing him of advocating leaving plates on the growing ends of bones. I made no such statement, but that in practice he had left plates on the growing ends of bones.

Turn to the case of Rashik Mohan, case 6 of fractures into the elbow joint.

This case aged 11 had a T-shaped fracture into the elbow joint. We know that in such cases the line of fracture runs just above but only just above the epiphyseal line. Two plates and 8 screws were used, and one need only look at the humerus of a child aged 11 to realise that at least one or more of those eight screws must have involved the epiphysis, yet there is no record of the plates having been removed.

Again, Kenneth Cole, aged 15, a Colles' fracture, controlled by a plate and 6 screws. A Colles' fracture lies between ½ inches to 1 inch of the articular margin and close to the epiphyseal line. (N. B.—I am aware that Colles in his original paper placed it at 1½ inches from the margin.) If none of the 6 screws involved the epiphysis, some of them must have been uselessly distributed over the upper fragment. There is no record of their being removed, although the lower epiphysis is the one at which growth mainly takes place. The ulna was not plated and deformity would appear to be inevitable. Perhaps, however, there is an explanation for the lack of deformity in these cases, namely, the extraordinary powers of resistance in Colonel Hallilay's young patients.

From the notes of the case of Ashraf Bibi, aged 7, we learn that on 13th October, 1923, two plates and eleven screws were applied to her fracture. About 2 years later skiagrams 3 and 4 are taken, one showing lateral and the other antero-posterior views. Not only do we find that there is an absence of rarefaction about the screws, but that 1 plate and 5 screws have been totally absorbed.

Colonel Hallilay has kindly recommended to me the perusal of a student's textbook of surgery. I am not ungrateful and would recommend in return Wilson and Cochrane's *Fractures and Dislocation.* (It and Scudder's new edition are the latest works on fractures.)

A careful perusal of the first chapter of the former, entitled "Principles of Treatment," will I hope enable him to exercise a better balanced judgment. On page 8 he will find the authors have ".....a decided preference for plaster of Paris as a splinting material" and on page 7 that for reduction "anæsthesia is practically always indicated."

I heartily endorse his last remark about methods being really up-to-date before venturing to criticise, etc., but it applies more strongly if we add ridicule to our criticism.

Colonel Hallilay himself uses plates and screws demonstrated by Hey Groves to be mechanically unsound as far back as 1913, (*British Journal of Surgery*, January 1914).

Plaster of Paris and anæsthesia are advocated in the three most recent works on fractures and by a surgeon of repute at the last meeting of the British Medical Association.

The more extended use of plaster of Paris at the present time is largely due to the advocacy of surgeons who have specialised in the treatment of fractures. These surgeons have devoted their professional careers to the study of fractures and have had infinitely better opportunities of observing and judging results of all methods of treatment than either Colonel Hallilay or myself can ever hope to have.

In conclusion, my letter was mainly a protest against the tone of Colonel Hallilay's article. It has obviously failed and I do not propose to continue the correspondence further, but leave it to your readers to draw their own conclusions.—Yours, etc.,

A. H. PROCTOR, *Lt.-Col.*, I.M.S.

CALCUTTA,
3rd February, 1927.

THE *FIELD* DISTEMPER FUND.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR.—We venture to request once more the hospitality of your valuable columns in order to inform the public of the progress of that research into the causes and prevention of distemper which has only been rendered possible by their constant munificence and their patient confidence in our efforts for so long a period. In our special buildings at Mill Hill, the continuous industry of the scientific workers of the Medical Research Council has produced results which have never been achieved before. A summary of our scientific report will shortly be sent you. Very briefly we will attempt to condense it in simple language into a reasonable space:—(1) Our investigators have confirmed that a filter-passing ultra-microscopic virus is the primary cause of distemper, and they have described the symptoms of the disease itself as distinguished from its many secondary maladies. (2) They have, by inoculation, rendered several of our puppies so far immune from the perils of distemper that a slight and temporary rise in temperature was the sole result of subsequent infection with the disease. (3) This means that on the lines along which they are working it is expected that a method will be evolved which will be capable of conferring upon dogs a lasting immunity from distemper.

It is necessary to explain further (*a*) why this immunity cannot be at once enjoyed by every dog, and (*b*) what may well be the last big step necessary for producing a safeguard which will not only be useful under practical conditions but easily procurable in all parts of the world where dogs are suffering from distemper.

The only process which can at present be employed involves the use of crude materials of uncertain and inconstant strength and quality. It is therefore completely unfitted for use by anyone except the skilled biologist working under the specially controlled conditions which we have created. There are several ways by which a more practical method may be developed and standardised; but an essential preliminary is the successful cultivation of the distemper-virus outside and apart from the body of an animal, to provide a more

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"It is most important in malaria cases that the diet should consist largely of milk. It is a remedy which possesses great value and one without which the child is not having a fair chance." *(Birch's Medical Treatment of Children in India, 6th Edition, p.238.)*

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Mr. G.	11	180/122	164/110	1-2 tabs. daily
Mr. J.	47	170/100	156/100	2 tabs. daily
Mr. M.	18	186/126	168/106	2-6 tabs. daily
Mrs. C.	20	218/118	170/100	3-6 tabs. daily
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abundant and satisfactory vaccine of constant quality and measurable strength. Thousands of experiments in this direction with filter-passing viruses of one kind or another are going on all over the world. It may take another month, another year, or more, to achieve our purpose; no one can tell. But we have done enough already to be able confidently to predict success, if we continue to receive support.

What that success will mean, both to dogs and to the human race, the communications you have published in a previous issue have sufficiently explained. But it is more than a year since we trespassed on your courtesy for space, and we do so now without any sensational appeal for urgent or excessive pecuniary aid. That aid has steadily been forthcoming, week by week, until we have reached within five thousand pounds of the £25,000 estimated as the total necessary for the completion of our work. Our old friends continue to stand by us. It is only therefore to bring our work to the notice of those who may still be unaware of it that we send you this letter; for we believe that no Englishman who owns or ever owned a dog will wish to stand outside the only movement that has ever given a certain prospect of mitigating the intolerable trouble of distemper. Supporters of our Fund should communicate with its Organising Secretary at Windsor House, Bream's Buildings, London, E.C.4. They will appreciate the fact that owing to our co-operation with the Medical Research Council, every ten shillings sent us immediately attains the value of a sovereign.

We desire publicly to express our thanks to all our helpers in the past year, to the Princes of India and our sporting fellow-countrymen in that great division of our Empire, to correspondents from all parts of the world who have read our previous statements in your columns, and more especially to the devoted, skilful, and indomitable labour of the scientific men to whom are due the real achievements rendered possible by the generosity of your readers.—Yours, etc,

PORTLAND,
(*President of the* Field *Distemper Council*).
BUCCLEUCH,
(*Vice-President*).
THEODORE A. COOK,
(*Hon. Secretary*).

WINDSOR HOUSE,
BREAM'S BUILDINGS,
LONDON, E. C. 4.
20th December, 1926.

THE TREATMENT OF CHOLERA.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—With reference to the article by Dr. S. Rajaram Bharati, L.M.P. in the December 1926 number of the *Indian Medical Gazette*, in which the author attempts to contrast the efficacy of Mist. Pro. Diarrhœa with Tomb's essential oils mixture, in the first place, I would remark that the number of cases quoted is by no means large enough to form the basis of any conclusions. Secondly, in Treatment *A*, he combines the Mist. Pro. Diarrhœa with an anti-cholera pill; whilst in Treatment *B*, together with the essential oils mixture, potassium permanganate pills are used. Obviously, if any strict comparison is to be made, the two mixtures should have been given alone, or the same adjuvant should have been used in both groups of cases.

In this Presidency we have had a very large experience of treatment of cholera with Mist. Pro. Diarrhœa, and the results obtained, far from being disappointing, show that in this mixture we have a very valuable method of combating the disease. It is only to draw attention to this fact that I would ask space for this letter in your next number.—Yours, etc.,

A. J. H. RUSSELL, C.B.E., M.D., D.P.H.,
Lt.-Col., I.M.S.,
Director of Public Health.

MADRAS,
6th January 1927.

Service Notes.

APPOINTMENTS AND TRANSFERS.

Major-General W. H. Ogilvie, C.B., C.M.G., K.H.P., Indian Medical Service, to be Director of Medical Services in India, *vice* Major-General O. L. Robinson, C.B., C.M.G., K.H.P., British Service, vacated. Dated 3rd January 1927.

The services of Lieutenant-Colonel W. W. Jeudwine, C.M.G., M.D., I.M.S., Civil Surgeon, Simla West, at present on combined leave in England, are re-placed at the disposal of the Government of the Punjab, with effect from the 1st December 1926.

Lieutenant-Colonel A. D. Stewart, I.M.S., Director of Public Health Laboratory and Professor of Public Health Laboratory-Practice, School of Tropical Medicine and Hygiene, Calcutta, is appointed to be Professor of Hygiene at the said School, with effect from the date on which he takes over charge of the appointment.

Lieutenant-Colonel N. M. Wilson, O.B.E., I.M.S., Officiating Civil Surgeon, Simla West, is confirmed in that appointment, with effect from the 1st December 1926.

Major H. Hingston, M.D., I.M.S., is appointed to act as Second Resident Surgeon, Presidency General Hospital, *vice* Captain S. A. McSwiney, M.B., F.R.C.S.I., I.M.S., granted leave.

The services of Major H. S. Anand, I.M.S., are placed temporarily at the disposal of the Government of Burma with effect from the date on which he assumes charge of his civil duties.

Subject to His Majesty's approval, the undermentioned officers have been appointed permanently to the Indian Medical Service as Lieutenants by the Right Hon'ble the Secretary of State for India. Their Commissions will bear dates as specified:—

M. K. Kelavkar, M.B.E., M.B. (Captain, I.M.S.—T.C.) Previous mobilized service as a temporary officer in the Indian Medical Service from 18th August 1919 to 25th August 1926 counts for pay, pension and promotion. Dated 26th August 1926.

G. S. Gill, M.B. (Captain I.M.S.—T.C.). Previous mobilized service as a temporary officer in the Indian Medical Service from 20th June 1923 to 25th August 1926 counts for pay, pension and promotion. Dated 26th August 1926.

Ranjit Sen, M.B. (Captain I.M.S.—T.C.). Previous mobilized service as a temporary officer in the Indian Medical Service from 7th February 1917 to 26th September 1926 counts for pay, pension and promotion. Dated 27th September 1926.

LEAVE.

Colonel K. V. Kukday, C.I.E., I.M.S., Inspector-General of Civil Hospitals, Central Provinces, is granted leave, preparatory to retirement, for 8 months on average pay with effect from the 15th January 1927.

Major E. W. O'G. Kirwan, F.R.C.S.I., I.M.S., officiating Civil Surgeon, Mymensingh, is granted leave on average pay for four months, with effect from the afternoon of the 22nd December 1926.

This department notification No. 3404 Medl., dated the 21st December 1926, is hereby cancelled.

Captain S. A. McSwiney, M.B., F.R.C.S.I., I.M.S., Second Resident Surgeon, Presidency General Hospital, is allowed leave for one year with effect from the 25th January 1927 or any subsequent date on which he avails himself of the leave.

PROMOTIONS.

Colonel to be Major-General.

Andrew Armstrong Gibbs, K.H.P., *vice* Major-General Walter Holland Ogilvie, C.B., C.M.G., M.B., K.H.P., appointed Director of Medical Services in India. Dated 3rd January 1927.

The promotion of Major J. B. de W. Molony, O.B.E., M.B., F.R.C.S.E., I.M.S., notified in Army Department Notification No. 1128, dated the 3rd September 1926, is antedated from the 6th August 1926 to 6th February 1926.

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Lieutenants to be Captains.

M. K. Kelavkar, M.B.E., M.B. Dated 26th August 1926, but to rank from 18th August 1920.

G. S. Gill, M.B. Dated 26th August 1926, but to rank from 20th June 1926.

Ranjit Sen, M.B. Dated 27th September 1926, but to rank from 7th February 1918.

Garrett Joseph Joyce, M.B. Dated 22nd December 1926.

James Scott Riddle, M.B. Dated 8th January 1927.

Gilbert Marshall Irvine, M.B. Dated 1st August 1926.

Temporary Lieutenants to be temporary Captains.

Asa Nand Narang, M.B. Dated 1st December 1926.

Ram Labhaya, M.B. Dated 12th December 1926.

RETIREMENTS.

Lieutenant-Colonel E. F. G. Tucker, I.M.S., with effect from the 24th October 1926.

Lieutenant-Colonel D. W. Sutherland, C.I.E., I.M.S., with effect from the 18th December 1926.

NOTES.

THE ALVARENGA PRIZE OF THE COLLEGE OF PHYSICIANS OF PHILADELPHIA.

THE College of Physicians of Philadelphia announces that the next award of the Alvarenga Prize, being the income for one year of the bequest of the late Senor Alvarenga, and amounting to about Three Hundred Dollars, will be made on July 14, 1927, provided that an essay deemed by the Committee of Award to be worthy of the Prize shall have been offered.

Essays intended for competition may be upon any subject in Medicine, but cannot have been published. The essay should represent an addition to the knowledge and understanding of the subject based either upon original or literary research. They must be typewritten, and in English acceptable for publication without necessity for editing by the Committee. Any illustrations should be appropriate and correctly annotated with the text. Essays must be received by the Secretary of the College on or before May 1, 1927.

Each essay must be sent without signature, but must be plainly marked with a motto and be accompanied by a sealed envelope having on its outside the motto of the paper and within the name and address of the author.

It is a condition of competition that the successful essay or a copy of it shall remain in possession of the College; other essays will be returned upon application within three months after the award.

The Alvarenga Prize for 1926 has been awarded to Drs. P. S. Pelouze and F. S. Schofield for their Essay entitled "The Gonophage."

LONDON MEDICAL EXHIBITION 1926. CENTRAL HALL, WESTMINSTER, LONDON, ENGLAND, OCTOBER 4 TO 8.

Burroughs, Wellcome and Co.'s Exhibit.

MOST medical men, whatever the field of their labours, found something of especial interest in the wide range of products exhibited by Burroughs, Wellcome & Co. Grouped alongside photographs of the highly-magnified organisms responsible for certain diseases were the appropriate medicaments for dealing with the disorders, together with a selection of 'Soloid' microscopic stains that appealed to those interested in the practical side of bacteriology.

A full range of 'Tabloid' animal substances was shown, including 'Tabloid' thyroid gland, 'Tabloid' mixed glands and 'Tabloid' parathyroid gland. In special racks were shown the various stages in the production of 'Tabloid' animal substances, from the fresh raw material to the finished compressed products. 'Welcome' Brand insulin and 'Tabloid' Brand hypodermic insulin (the only British insulin issued as a compressed product, remind us of the pioneer rôle played by Burroughs, Wellcome & Co. in the early days of insulin treatment, and of their subsequent researches which have materially lowered the price and increased the supply of this valuable medicament.

Worthy of special attention were the 'Wellcome' Brand bismuth salts, for which an exceptionally high standard of purity and physical and chemical uniformity is claimed, and 'Wellcome' Brand sodium salicylate, which dissolves easily and is physiologically pure. These preparations are characteristic of the fine chemicals manufactured by this well-known house.

Potential additions to the medical man's armamentarium were exhibited in 'Avenyl' (a mercurial preparation soluble in hydnocarpus oil) and 'Neostam.' The former has been evolved for dealing with cases of syphilis complicated with leprosy. 'Neostam' stibamine glucoside has been found of service in kala-azar, and in other conditions where tartar emetic has hitherto been used.

Of general interest was the display of 'Wellcome' Brand vaccines, sera, tuberculins and diagnostic products, prepared at the Wellcome Physiological Research Laboratories and distributed by Burroughs, Wellcome & Co.

REGULIN FLAKES.

A VERY interesting and palatable preparation is Regulin Flakes for the treatment of habitual constipation, prepared by the Regulin Syndicate, 14, Philpot Lane, London, E. C. 3. Habitual constipation is especially prevalent in the tropics, and especially so amongst women, whilst treatment of the condition by violent aperients only tends in the long run to aggravate it.

Regulin Flakes are a combination of agar-agar with a tasteless preparation of cascara; the former having a purely mechanical and water-absorbing evacuant action in the intestine, whilst the latter increases peristalsis without causing colic. The preparation is practically tasteless and can be taken mixed with food or simply stirred into water, tea, or coffee. The dose for patients with habitual constipation is from one teaspoonful to one tablespoonful (according to requirements) taken three times a day until the bowels have become regular.

This preparation is one of the most elegant that we have seen, and reports in the *Lancet* and *British Medical Journal* speak well of it. The sole agents for India, Burma and Ceylon are Messrs. Mangalik and Co., Seva Sadan, Meerut City, United Provinces, India.

Publishers' Notice.

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Communications on Editorial Matters, Articles, Letters and Books for Review should be addressed to THE EDITOR, *The Indian Medical Gazette*, c/o The Calcutta School of Tropical Medicine, Central Avenue, Calcutta.

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Original Articles.

THE TREATMENT OF PUERPERAL ECLAMPSIA, WITH NOTES ON 220 CASES OF PUERPERAL ECLAMPSIA TREATED AT THE GOVERNMENT HOSPITAL FOR WOMEN AND CHILDREN, MADRAS, DURING THE YEARS JANUARY 1922 TO JULY 1926.*

By C. A. F. HINGSTON, C.I.E., O.B.E.,
LIEUT.-COL., I.M.S.,
and
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IN a paper contributed by us to the *Indian Medical Gazette* in 1922 we submitted an analysis of 450 cases of eclampsia treated at the Madras Maternity Hospital between the years 1908 and 1922, and then touched therein on some factors which we thought were of primary importance in the treatment of the disease.

Since the publication of this paper, we have had under our treatment a large number of cases, wherein we had the advantage of not only putting into practice the principles we had enunciated, but also closely following each one of these cases. It is not often that one can publish an analysis of over 200 cases of eclampsia wherein one definite line of treatment was followed and the same persons practically were privileged to observe and treat the condition. Our results must therefore be interesting from this point of view if from no other, and we feel no apology will be required of us in submitting our experiences and our results to this Congress.

During the period under review, 12,733 women were confined at the Government Hospital for Women and Children, of whom 3,511 were primiparæ and 9,222 multiparæ, and there were 220 cases of eclampsia, giving a rate of incidence of 1.73 per cent. This shows a very high rate indeed, the only other rate which exceeds this being that of Lichtenstein, whose rate was 2.68 per cent. Of the 220 cases, 139 were primiparæ and 81 multiparæ, so that the percentage of the primiparæ was 63.18 and among multiparæ 36.82. It should also be noted that the incidence of this disease among primiparæ was 3.96 per cent. and among multiparæ 0.88 per cent., thus showing that it is 4.5 times as great among primiparæ as among multiparæ.

Distribution according to age and number of pregnancy.—The youngest recorded was in a girl of 15 years, while the oldest was a 14th-para aged 45 years. Eclampsia occurs most frequently in primiparæ and decreases with subsequent pregnancies. Thus there were 139 cases in primiparæ, 24 in 2nd pregnancies, 22 in 3rd pregnancies, 11 in 4th pregnancies and 8 in 5th pregnancies.

Clinical features.—Eclampsia occurs almost always in the second half of pregnancy, the earliest period at which it occurred in this series being the 6th month. It generally tends to increase in frequency in the later months and is most frequent at term. An observation of some interest is the fact that it tends to occur earlier in the course of pregnancy in multiparæ than in primiparæ. Thus, while it occurred before full term in 20 per cent. of the cases in primiparæ, in over 57 per cent. of the cases in multiparæ the fits came on before term. The latest period when the disease occurred was the 29th day after confinement. The disease is relatively more common in twin pregnancies, there having been ten cases among twin cases giving a rate of incidence of 4.63 per cent., while the percentage of twin cases to total number of cases treated was 1.69 per cent.

The condition is commonly seen in well built, plethoric individuals. Œdema was marked in nearly 50 per cent. of the cases. In cases where a fairly cogent history could be obtained, the chief prodromal symptoms complained of were headache, epigastric pain and visual disturbances. Seventy out of 220 cases were admitted in an unconscious condition. Diminution in the quantity of urine passed was noted in over 70 per cent. of the cases. Only one patient in her fourth pregnancy gave a history of eclampsia in her first and third pregnancies.

Blood pressure.—This, in our experience, is the most important factor to be noted in cases of eclampsia. The blood pressure is generally well over 140 mm. in cases of eclampsia, and usually varies between 160 and 170 mm. The highest blood pressure noted was 220 mm., while the lowest on record was 55 mm. after an injection of veratrone. We have noticed that a high blood pressure generally predisposes to a larger number of fits and to a greater degree of coma. Thus, in over 80 per cent. of the cases where more than 10 fits occurred, the blood pressure varied between 170 and 220 mm. This has an important bearing on the treatment as will be noticed later.

Albuminuria.—Albuminuria was not a constant feature in these cases. Thus it was present in 89 per cent. of the cases where the urine was examined soon after the fits. The amount of albumin present is not proportionate to the severity of the case and in most cases the condition clears up in a few days.

The temperature is usually normal at the time of occurrence of the fits, but later shows

* A paper read at the *Indian Science Congress*, Lahore, in January, 1927.

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a tendency to rise in some cases. Occasionally hyperpyrexia may set in. In 17 cases in this series the temperature rose to 104°F. and over within the first 24 hours. Later in the course of the disease the fever may be due to complications in the lungs or to puerperal sepsis. The convulsions are the chief clinical symptom of the disease. In over 90 per cent. of the cases the patients were admitted with a history of having had fits at home, the number of fits varying from 1 or 2 to 20 or 30. The fits are more common during labour, less so during pregnancy and much less during the puerperium. It was noticed that 46.8 per cent. of the cases occurred during labour, 27.7 per cent. were ante-partum and 25.5 per cent. post-partum. The largest number of fits occurring in any single individual was 72 and it is interesting to note that the patient recovered. The degree of coma varies with the number of fits, but we have noticed cases where the coma was deep even with a few fits, and one case in which after a single fit the patient never recovered from deep coma.

The chief complications noticed were œdema of the lungs, broncho-pneumonia, deglutition pneumonia, failure of the heart, and puerperal insanity. Puerperal sepsis is perhaps more likely in cases of eclampsia.

Treatment.—The treatment of puerperal eclampsia may be dealt under the four headings.

(1) Treatment during a fit.
(2) Prevention of fits.
(3) Treatment of labour.
(4) Treatment of complications.

(1) *Treatment during a fit.*—During a fit, the mouth gag is inserted, care being taken to see that it is slipped in between the molars, as otherwise cases have occurred when an excitable nurse or attendant has forced the gag from in front causing dislocation of the incisors. The patient should be turned to one side and kept in the recumbent posture either on an eclamptic board or on a protected cot; all tight fitting garments and jewels should be loosened or removed and the respiration watched, the tongue being prevented from slipping back. Excepting that care should be taken to prevent the patient from injuring herself during the convulsions, it is unnecessary to restrain her forcibly.

(2) *Prevention of fits.*—This is one of the most important of the problems in the treatment of the disease. We do not know definitely what is the causative factor in eclampsia and our treatment must be in the main empirical. We are convinced that the control of fits is essential and that the most important factor to be reckoned with is the high blood pressure. Our treatment then is directed towards the reduction of the high blood pressure. At first we attempted to do this by venesection. The median basilic vein or cephalic vein was opened and from 12 to 20 ounces of blood were let out, so that the blood pressure was reduced to 120 mm. or less. At one stage we used to transfuse normal saline into the veins with the hope that thereby the toxins in the blood would be diluted.

We hold that these measures are unnecessary and undesirable. Since 1922, we have used veratrone, the active principle of *Veratrum viride,* to reduce the blood pressure; 1 c.c. of veratrone (P. D. and Co.) is given subcutaneously if the blood pressure is above 140 mm., and ½ c.c. if it is below. This produces a sharp fall in the blood pressure in 15 to 30 minutes and the blood pressure is kept down for varying periods afterwards. In most cases two injections at an interval of 2 to 3 hours sufficed. We have however given as much as 6 c.c. of veratrone in 24 hours with no bad results. In cases where a high blood pressure persists in spite of repeated injections of veratrone, we have performed venesection with good result. This method of treatment was adopted in the case reported above where the patient had 72 fits. The injection of veratrone produces a rapid and considerable fall in blood pressure and a corresponding fall in the pulse rate. Occasionally the blood pressure falls very suddenly and alarming signs of collapse occur, but these are rapidly overcome if the patient is given an injection of strychnine, and later saline and glucose per rectum.

We have used veratrone very largely as a prophylactic in cases of threatening eclampsia (albuminuria with persistent high blood pressure) with uniformly good results. The injection of veratrone occasionally causes severe vomiting, the patient sweats freely and feels a sinking sensation in the epigastrium. The symptoms however do not persist for long and in a couple of hours, the patient perhaps dozes off to sleep.

Besides the injection of veratrone, morphia is given to check the fits. We start with an initial dose of ¼ to ⅓ grain and repeat it at intervals of 2 to 3 hours if fits persist. Since commencing the use of veratrone we have noticed that it is not necessary to use morphia in such large doses, the maximum we have used being 1 grain in 24 hours.

Care should be taken to see that the patient is kept quiet in a darkened room, and that she is disturbed as little as possible, particularly when she is at all restless or mentally excitable. Under such circumstances it is wise to give an injection of morphia, and as soon as she is under its effects to proceed with the examination, to draw off the urine or to give her an enema.

When the patient is quiet she is given a large soap and warm water enema which is

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followed by sodium bicarbonate bowel washes (1 drachm to 1 pint) every 4 hours.

We have given up the idea of gastric lavage, which at one time was extensively practised in this hospital. It has not in the least interfered with the recovery of the patient, but on the contrary we are convinced that lung complications occur much less frequently without it. Thus while such complications occurred in more than a third of the cases in the days of gastric lavage, our figures show that they occurred in less than 10 per cent. of the cases at present. If the patient is conscious she is given a saline purge, an ounce of magnesium or sodium sulphate.

We hold that no food of any description should be given for at least 12 hours after the woman ceases to have any fits and regains consciousness. Eclamptics stand starvation quite well and any attempt at forcing food, even if it be milk, increases the chances of fits and might increase the tendency to deglutition pneumonia. When the patient is conscious she is given milk and barley water.

(3) *Treatment of labour.*—We hold that *accouchement forcé* should never be adopted in cases of eclampsia and we are definitely of opinion that nothing is to be gained by precipitating labour whatever may be the method employed. Our teaching is to leave the woman alone, so far as labour is concerned but to terminate the second stage of labour earlier without waiting for signs of fœtal or maternal distress. Thus we deliver the woman if the os is nearly fully dilated and the membranes ruptured. This we do in the interests of both mother and child, the mother because the strain on the heart may be severe and a certain amount of hæmorrhage consequent on delivery would relieve it and lessen the blood pressure, the child because we have noted that the longer the fœtus is *in utero* after rupture of membranes, the greater is the degree of oligopnœa or asphyxia.

Of the 220 cases referred to, 211 were delivered in the hospital, of whom 131 were delivered by natural powers and 20 by artificial aid. The maternal mortality among the natural deliveries was 5.34 per cent., while among the aided labours there was a mortality of 16.25 per cent.

(4) *Treatment of complications.*—The best method of treating complications is to prevent them, and many of the complications of eclampsia can be prevented. Careful and intelligent nursing are essential. The patient should be kept on each side alternately, mucus cleared from the throat, care taken that the head is low in cases of vomiting and care in feeding. All these will reduce the risks of lung complications. For œdema of the lungs, besides reducing the blood pressure, injections of atropine, adrenalin and strychnine are useful.

Oxygen inhalations may be given, and where broncho-pneumonia has supervened the usual treatment for this condition should be adopted. The condition of the heart should be carefully noted and cardiac stimulants given when necessary.

Scrupulous care should be observed in all vaginal manipulations as sepsis is more prone to occur in eclamptics.

For hyperpyrexia, iced enemas and hydrotherapy to the extremities would be of value.

In cases of cerebral irritability and mania, large doses of bromides, occasionally combined with chloral or injections of hyoscine have been given.

Prognosis.—The prognosis depends on several factors.

1. The frequency of the fits.
2. The degree of coma.
3. Temperature.
4. Pulse.
5. The extent of albuminuria.
6. Lung complications.
7. Nature of delivery.
8. The time of admission for treatment.
9. Whether the fits occurred *ante-partum, intra-partum* or *post-partum.*
10. High blood pressure.

A large number of fits (over 12), deep coma, a temperature above 104°F, rapid pulse, severe albuminuria, broncho-pneumonia and œdema of the lungs, artificial delivery if hurried, are all factors leading to a bad prognosis. The later the patient comes under treatment after the first fit, the worse the prognosis. A persistently high blood pressure is of bad prognostic significance. The prognosis is more favourable in post-partum eclampsia than in ante-partum and is worst in intra-partum cases.

Results.—Of the 220 cases treated during this period, 22 ended fatally, giving a gross mortality of 10 per cent. Of these, 4 cases were admitted in a moribund condition and died within 4 hours after admission. Moreover, in judging the results of the treatment referred to above, it is only fair that cases treated by other methods should be excluded. There were 5 such cases with 2 deaths. Excluding the moribund cases and the cases treated along other lines, we get a corrected maternal mortality rate of 7.58 per cent. We are of opinion that if the treatment we have adopted is carried out in all its details, the mortality from puerperal eclampsia would not exceed 6 to 8 per cent. The figures are sufficiently large and the period covered extensive enough to test the value of the treatment adopted.

Infantile Mortality.—221 children were delivered, of whom 142 were born alive, 63 still, and 16 macerated. The percentage of live births was 64.28. Of the 79 cases of still

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births, in 31 the fœtal heart was not audible at the time of admission.

APPENDIX.

Total number of obstetric cases.

Primiparæ	3,511
Multiparæ	9,222
Total ..	12,733

Total number of cases of Eclampsia.

Primiparæ	139
Multiparæ	81
Total ..	220

Rate of incidence of disease ..	1.73%
Incidence in primiparæ ..	3.96%
Incidence in multiparæ ..	0.88%
Percentage of primiparæ in eclamptics ..	63.18%
Percentage of multiparæ in eclamptics ..	36.82%

Distribution according to Parity.

Para.	I	II	III	IV	V	VI	VII	VIII	IX	X	XIV
Number of cases.	139	24	22	11	8	5	6	..	3	8	1
Deaths	17	2	..	8	..	1	1	..	..	..	..

Distribution according to age.

Age	15	16	17	18	19	20	21 to 25	26 to 30	31 to 35	Above 35
No.	82	22	14	33	9	46	46	28	8	2

Earliest age, 15 years
Latest age, 45 years in a 14th-para.

Relations with reference to period of pregnancy.

	Primiparæ.		Multiparæ.		Total.	Percentage.
	No.	%	No.	%		
Eclampsia at full term.	110	79·13	38	42·76	138	67·27
Eclampsia before full term.	29	20·87	43	57·31	72	32·73

Incidence of twins.

Total number of twin pregnancies ..	216
Number of cases of eclampsia ..	10
Percentage of incidence	4.63
Percentage of twin cases of fatal deliveries	1.69

Classification according to the time of fits.

	Number.	Percentage.	Deaths.	Mortality rate.
Ante-partum ..	61	27.73	5	8.2
Intra-partum ..	103	46.82	15	14.56
Post-partum ..	56	25.45	2	3.57

Methods of delivery.

Kind of delivery.	Number.	Deaths.
Natural powers	131	7
Forceps	68	9
Podalic extraction	6	1
Cæsarian section ..	5	2
Forceps after symphisiotomy ..	1	1
Total ..	211	20
Percentage of aided deliveries ..	37.91	
Mortality among aided ..	16.25	
Mortality among natural ..	5.34	

THE TREATMENT OF PUERPERAL SEPSIS, WITH SOME NOTES ON THE BACTERIOLOGY OF PUERPERAL FEVER.*

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PUERPERAL sepsis is still one of the most serious complications in the puerperium and stands perhaps foremost among the causes of maternal mortality following childbirth. Despite all the improvements in bacteriological technique and the knowledge gained from a close study of the bacteriology of puerperal fever, it must be stated that there has been no appreciable difference in the incidence of this disease within the past twenty years even in Great Britain. Statistics show that. In this country the incidence of the disease is very much greater. In Southern India maternal mortality from sepsis is at least 6 to 8 times as great as it is in England and Wales, and in the city of Madras the returns show that 1 out of every 60 mothers dies from puerperal sepsis. The problem then of prevention and cure of this serious complication is one that deserves the close attention of all obstetricians in this country more than anywhere else, and it is to focus that attention and to stimulate a discussion that we have ventured to submit this paper to the Congress. At the Government Hospital for Women and Children in Madras about 3,000 women are confined every year, while a large number of women confined outside are admitted suffering from puerperal sepsis of varying severity. The scope then for a close study of this disease as it manifests itself under local conditions has been considerable, and while we do not lay any claim to any new line of treatment, we think it will not be out of place to put on record our experience in regard to the treatment of this disease.

During the last twenty years it has been the practice in this hospital to segregate all women who are in labour but who have been examined outside to a separate wing, where the patients are delivered in a separate labour ward and accommodated in the puerperal wards adjoining. No patient is refused admission and all women confined outside and brought in with or without signs of puerperal sepsis are likewise kept separate in the septic block. This has to a very large extent reduced the chances of infection in the hospital.

Prophylaxis.—This undoubtedly is of the greatest importance and naturally commands

* Being a paper read at the *Indian Science Congress*, Lahore, in January 1927.

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the greatest attention in a training institution such as ours. Perhaps no factor is of greater importance than that of the ante-natal care of the mother. Our experience is that sepsis is very much rarer among the *batta* women who are kept under our personal observation during the last two or three months of pregnancy and given a daily dole of two annas. These women are carefully looked after and attended to at an early stage.

It needs no emphasis to say that the most potent factor in the production of sepsis is the attendant, and while we are not prepared to deny the possibilities of intrinsic infection, it may safely be stated that extrinsic infection or possibilities of it should never be ruled out so long as any sort of manual interference has been attempted. Strict antiseptic precautions are required whether gloves are used or not, and vaginal examinations should be made only when considered inevitable. The proper cleansing of labia and perineum and care in vaginal examination and the introduction of the finger by sight after well separating the labia are of importance.

In normal labour a vaginal douche is never given. In cases of prolonged labour, when the cervix is not fully dilated and the membranes have ruptured, and in cases where the woman has been handled outside and the vagina badly bruised or where a purulent vaginal discharge is present, a hot vaginal douche with lysol (1 drm. to the pint) is given.

Our experience is that there are greater risks of sepsis in the application of forceps than in most of the other obstetric operations, excepting the manual removal of placenta. We have rarely met with severe sepsis in cases of version even when performed in cases of neglected transverse presentation. In particular where the forceps are applied in occipito-posterior or mento-posterior presentations, or in minor degrees of contracted pelvis or where the head is high up, in cases where the cervix is rigid or the anterior lip is prolapsed, the cervical and vaginal lacerations that are almost inevitable are fruitful causes of sepsis. We have practically given up the operation of high forceps, and prefer version and extraction, provided there are no contra-indications. It is of great importance to repair all tears wherever possible and we found the application of Tr. Benzoin Co. efficient in arresting the oozing and preventing sepsis in all cases of vaginal and cervical lacerations.

Two conditions especially predispose to puerperal sepsis, post-partum hæmorrhage, and retention of membranes, blood clots or bits of placenta. Every care should be taken to prevent the latter, but we are definitely against any intra-uterine manipulation to remove membranes or small bits of placenta immediately after delivery.

Treatment.—The treatment of puerperal sepsis depends very much on the condition of the patient when first seen and whether the patient is suffering from a localised infection of the generative tract or from a generalised infection. If the temperature rises above 100°F. during the puerperium, an immediate investigation should be made to find out the cause, and in the absence of any definite causative factor, the case should be deemed to be one of puerperal sepsis. In this country some of the factors which may give rise to fever during the puerperium are malaria, dysentery, pneumonia, kala-azar, tuberculosis, and intestinal worms. When however none of these causes are present, a careful examination of the patient is needed. The pulse and temperature and the general condition of the patient is noted. The height of the uterus should be noted and whether it is well contracted or flabby, painful and tender. The lochia should be observed, its colour, smell, method of staining, its character and quantity, particular care being taken to note the presence or absence of clots, fragments of placenta and membranes. The perineum should be examined with a view to find out if there have been any lacerations, or if sutured whether the sutures are taking and the perineum healthy. We generally examine the patient on the table in order to note the condition of the cervix and vagina. At the same time cervical and uterine swabs are taken for bacteriological examination. A hot vaginal douche is given, any ulcers present in the vagina or cervix are touched with a fairly strong antiseptic such as medical izal, tincture of iodine, tinctura benzoinæ co., or a saturated solution of picric acid, and if the perineal stitches are unhealthy they are removed and the perineum laid bare to promote free drainage.

The vaginal douche.—In cases of sapræmia hot vaginal douches are given every four hours if necessary, the solutions used being lysol (1 in 160), iodine (1 in 80), eusol, and saline. Where the lochia are very foul smelling, iodine douches are preferred. The vaginal douche helps to clean the parts, favours free drainage and provokes uterine contractions.

In cases where there is extensive sloughing of the vaginal walls and cervix—what is termed here the 'cesspool vagina'—continuous irrigation with a mild antiseptic is very efficient. Weak lysol or saline is generally used and the douche is given continuously except for an interval of 2 hours by day and 4 hours by night. In case the perineum is œdematous or badly ulcerated hot boracic compresses are advisable.

The Uterine Douche.—The place of the uterine douche in the treatment of puerperal

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sepsis is a debatable point. We have for some years past considerably limited the scope of the intra-uterine douche. With all precautions, it is not free from risks, and in most cases its value is doubtful. In cases of pyometria no doubt it helps to drain the uterus and there is a sharp fall in the temperature and marked improvement in the general condition of the patient. The mechanical use of the intra-uterine douche in all cases of sepsis or even in cases of pyrexia during the puerperium cannot be too strongly condemned It is by such methods that a mild case is converted into a severe one. Since discontinuance of the frequent use of the uterine douche we have noticed that the period of pyrexia in sapræmic cases is very much less and that fewer cases develop into the severe forms of sepsis.

Curettage and Ecouvillonage.—We have found that even in cases where the uterus is filled with decomposing lochia, drainage with the help of a Budin's tube is sufficient. This may be repeated on alternate days or even daily if necessary and has the advantage over the uterine douche that the patient does not suffer from shock or hyperpyrexia. In cases where it is suspected that bits of placenta or membranes or disintegrating blood clots are left behind in the uterus, it is advisable to remove them by digital evacuation of the uterus. With the patient under chloroform it is often possible to completely explore the uterus by careful bimanual manipulation.

The next method adopted in this hospital is a modified écouvillonage. Instead of using the brush, a rough piece of sterilized gauze is wound round an intra-uterine forceps and the whole of the inside of the cavity is swabbed round. This is done three or four times till all the debris is removed. It may be done after digital exploration and has proved very useful.

We are definitely of opinion that the curette is not a safe instrument to be used in the puerperium. It is ineffective, lays open fresh channels of infection, causes severe hæmorrhage at times, may lead to risks of perforation and generalised infection. Since the practical abandonment of the curette we have noticed a distinct diminution in the number of severe cases of sepsis and a more rapid recovery in cases treated without curettage. We must state that we have frequently come across cases where curettage has been done for uterine sepsis with the result that the condition has become much worse and septicæmia has supervened. Even in cases where curettage is supposed to have been beneficial, we are inclined to the belief that the cases would have improved under a more conservative line of treatment. We must add however that the use of the curette in infection occurring as a result of abortion in the early months of pregnancy is not only justifiable but is attended with very favourable results.

Postural Treatment.—A good method of favouring drainage is to raise the head of the bed or put the woman in Fowler's position. This generally helps to drain the uterus and vagina and tends to limit the possibilities of the spread of infection into the peritoneum. It may be stated here that distension of the bladder leads to the retardation of the free flow of lochia and thus favours a lochiometria or pyometria. In all cases of instrumental delivery care should be taken to see that the bladder is emptied in time, as otherwise the uterus may be pressed upon and get displaced backwards.

In cases of sub-involution ecbolics are needed, a mixture of the liquid extract of ergot with quinine being commonly given. Injections of pituitrin given daily or twice a day are also of considerable value. Hot vaginal douches should be given, at least twice a day.

Operative measures.—The question of operative treatment in cases of puerperal infection has been much discussed of late. The operations suggested are hysterectomy, laparotomy, salpingectomy and oophorectomy, posterior colpotomy, ligature or excision of the pelvic veins. We have not been in favour generally of the principle of operative treatment in cases of puerperal sepsis and the results obtained by those who advocate such methods of treatment have not been encouraging. We have limited the use of operative measures to definite indications. In cases where there is a definite swelling in Douglas's pouch which is fluctuating, the abscess may be drained by an incision into the posterior fornix. Even here it may be stated that in many cases of pelvic cellulitis the inflammation subsides with absolute rest in bed, hot vaginal douches, warm boric bowel washes, icthyol and glycerine (10 per cent.) tampons to the vagina. In a large proportion of cases the symptoms gradually subside an the exudate is almost completely absorbed in the course of a few weeks.

When the cellulitis goes on to suppuration, the abscess should be opened in the most favourable position for drainage. In many cases the abscess can best be opened by an incision along the iliac region parallel to Poupart's ligament.

In cases of infection of the Fallopian tube and ovary, we hold that a conservative line of treatment is indicated. We are not in favour of the removal of an acute pyosalpinx or ovarian abscess, and our experience is that it is very much better to decide the question after the acute stage has subsided. The treatment should in the meantime be directed to the peritoneal symptoms.

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Opening and drainage of the abdominal cavity has been done in cases of puerperal peritonitis, but the results have not been satisfactory. In cases following abortion the operation is more successful.

Serum and Vaccine Therapy.—Antistreptococcic serum in cases of puerperal sepsis has not been found to be as useful as was first anticipated. In cases where the patient is already septicæmic, we have found it practically of no value. Used as a prophylactic, its value is undoubted. During last year the serum has been used in every case where the placenta had to be manually removed. Out of ten cases in which the serum was used, eight recovered. It may be stated that in seven of these cases the patient was confined at home and brought in 6 to 12 hours later in a condition of collapse with severe bruising of the vagina and cervix and the placenta adherent. Only one case died. The initial dose given was 20 c.c. and this was repeated daily. The temperature did not rise above 102°F. and the patient showed signs of mild sapræmia. We are of opinion that the result in these cases is not accidental and that antistreptococcic serum has its place as a prophylactic in puerperal sepsis. It may also be stated that in one of the fatal cases, uterine culture revealed the presence of *Bacillus coli* and perhaps this accounts for the fact that the serum was of no use. Stock vaccines (polyvalent) were used in a large number of cases with uniformly poor results. Autogenous vaccines have been tried in a few cases but owing to the delay in their preparation and the severity of the cases selected, it is not possible for us to speak of their value with any authority. We have recently isolated a large number of the different strains of streptococci, hæmolytic and non-hæmolytic, as well as other organisms occurring in cases of puerperal sepsis and a polyvalent vaccine has been prepared and is being given a trial. The results we shall watch with interest.

General treatment.—Careful nursing and a stimulating line of treatment should be followed in these cases. The diet should be light, liquid and easily digestible. Milk, arrowroot, Ovaltine, Benger's, are among the common foodstuffs given. Essence of chicken or Bovril is also used with advantage. Eggs, raw or as egg-flip, are usually well taken. Glucose and brandy or champagne may be given at intervals of two to three hours and are of value in cases of severe exhaustion.

For the pyrexia, hydrotherapy is generally practised. Strong antipyretics are to be deprecated. Injections of quinine have been given and occasionally proved beneficial. In cases of *B. coli* infection, hexamine in doses of 7 to 10 grains has been given intravenously, but the results have not been satisfactory.

In cases showing severe toxæmic symptoms saline solution has been used, either subcutaneously or *per rectum*.

Infection of the urinary tract is always a troublesome complication in septic cases. The use of the catheter during the puerperium should be discouraged as far as possible. Another cause of infection is tears of the clitoris and urethra, particularly in forceps delivery, where in attempting to save the perineum the forceps is carried too far forwards. The use of urinary antiseptics with the administration of large quantities of barley water generally suffices in most cases. Occasionally an ascending infection of the urinary tract results and the pyrexia may persist for a long period.

A complication of grave prognosis is the severe anæmia that occasionally develops in cases of puerperal sepsis. The anæmia though of the secondary variety progresses very rapidly and proves fatal. In such cases the patient fails to respond to any treatment and sinks gradually.

Sometimes cases of puerperal sepsis develop severe pains in the pelvic joints and are unable to move the limbs. This is accompanied at times with several neuralgic pains shooting down the thighs. Calcium therapy has been of some benefit in some cases but not in all, and the exact causation of this troublesome complication is not known.

Conclusion.—We have attempted to describe in a general way the treatment of puerperal sepsis as carried on at the Madras Government Hospital for Women and Children. During the past 10 years (1916-25) there were 26,531 deliveries. The total number of septic cases treated was 1,574 of which 282 cases were cases of puerperal septicæmia. There were 95 deaths from septicæmia and 7 from severe sapræmia. The mortality rate for septicæmia would thus be seen to be 34.68 per cent.

Our thanks are due to Dr. M. B. Prabhu, M.B., B.S., who was responsible for carrying out the actual treatment in these cases and whose careful notes and statistics were of great help to us in our work.

AN ANALYSIS OF RESULTS OF BACTERIOLOGICAL EXAMINATION OF UTERINE AND VAGINAL SWABS IN CASES OF PUERPERAL SEPSIS, THE NORMAL PUERPERIUM, AND PREGNANCY. (PERFORMED BY ASSISTANT SURGEON J. H. THEODORE, I.M.D., KING INSTITUTE, GUINDY.)

The study of streptococcal incidence in cases of puerperal fever was first undertaken. In this series a group of 120 cases were examined and streptococci were isolated from 77 or 64.2 per cent. of the cases examined. The relatively higher proportion of streptococcal

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findings in relation to the severity of the cases may be seen from the following table:—

	Mild.	Severe.	Fatal.
Number of cases.	67	36	17
Number of cases associated with streptococcal infection ..	40	24	13
Proportion ..	59.7%	66.6%	76.4%

The total of 77 positive findings when further subdivided into the hæmolytic and non-hæmolytic varieties, group themselves as follows:—

	Mild.	Severe.	Fatal.	Total.
Hæmolytic variety ..	36	22	9	67
Proportion ..	90%	91.6%	69.2%	85.1%
Non-hæmolytic variety	4	2	4	10
Proportion ..	10%	8.4	30.8%	14.9%

The streptococci fell into one or other of Holman's groups.

The possibility of organisms other than streptococci being associated factors in puerperal fever was next considered. The next series of swabs from cases of puerperal fever were examined with a view to ascertaining their entire flora. The results obtained are tabulated as follows:—

	Streptococci.	*B. coli.*	Staphylococci.	Diphtheroids.	Other organisms.
Sapræmia ..	9	2	11	3	4
Septicæmia ..	6*	3	—	—	—

* Of these, streptococci were found in association with pneumococci and staphylococci in one case, and with *B. coli* in another.

The 29 cases of sapræmia, when analysed to shew the relation the isolated organisms bore to the severity of the case, indicate that streptococci and *B. coli* were associated with the more severe form of cases.

Sapræmia Cases, 29.

	Streptococci.	*B. coli.*	Staphylococci.	Diphtheroids.	Other organisms.
Mild ..	3	1	9	3	3
Severe ..	6	1	2	1	—
Fatal ..	—	—	—	—	—

Note.—Of the 3 streptococci findings two were from both uterine and vaginal and one from the vaginal swab only, the remainder isolated were for the most part from both uterine and vaginal swabs.

Septicæmia Cases, 9.

Mild ..	—	—	—	—	—
Severe ..	4	2	—	—	—
Fatal ..	2	1	—	—	—

The above table shows rather forcibly the predominance of streptococci and *B. coli* in the more severe and fatal forms of our cases, with a complete absence of the less virulent organisms which were so closely associated with the milder form of the disease.

Note.—The isolations in each instance in this series were from the uterine discharge and for the most part pure cultures. One of the fatal streptococcal infections gave in addition a growth of *B. coli.*

Vaginal Flora in 21 cases of full term. Pregnancy.

The results obtained in this group are as follows—

No growth.	Yeasts.	Diphtheroids.	Streptococci.	Staphylococci.	*B. vaginalis* and saprophytic bacteria.
7	6	4	1	1	2

The figures obtained in this table will be considered in the discussion of the endogenous nature of puerperal infections.

A series of 12 cases from which uterine and vaginal swabs were separately examined during a normal puerperium, gave the following results:

	No growth.	Yeasts.	Diphtheroids.	Streptococci.	Staphylococci.	Saprophytic bacteria.	Sarcinæ.
Uterine ..	9	—	3	—	—	—	—
Vaginal ..	—	3	10	2	2	2	2

In 8 of the vaginal findings more than one organism was found, diphtheroids being associated in two instances with each of the following: yeasts, staphylococci, sarcinæ and saprophytic bacteria.

CONCLUSIONS.

The above analysis shows that streptococci play a prominent part in the production of puerperal fever. The hæmolytic variety is more often associated with the serious cases, but its exact pathogenicity requires further investigation.

From an examination of the discharge—uterine and vaginal—in cases of puerperal fever, we noted that the following organisms were present in addition to streptococci in cases of sapræmia: *B. coli*, staphylococci,

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diphtheroids, the *B. vaginalis* and other organisms. In septicæmia however the only organisms isolated were streptococci and *B. coli*.

We examined the vaginal flora of healthy pregnant women in 21 cases, and except in one case where a streptococcus and one in which a staphylococcus was present, no pathogenic organisms were isolated. Twelve of these cases were followed up after delivery and an examination of the uterine and vaginal swabs in the puerperium showed that the uterine swabs were sterile in 9 cases and contained only diphtheroids in 3, while the vaginal swabs showed mainly diphtheroids and yeasts.

THE USE OF FISHES FOR THE CONTROL OF MOSQUITOES.

By SUNDER LAL HORA, D.SC.,

Officiating Superintendent, Zoological Survey of India (Indian Museum, Calcutta).

(Read at the Fourteenth Annual Meeting of the Indian Science Congress and published with permission of the Director, Zoological Survey of India.)

DURING the last couple of decades great advance has been made regarding the study of fishes in their relation to the mosquito problem. The subject is, however, still in its infancy and a lot remains to be done. I have been able to collect 53 references on the subject, of which 13 deal with this problem in India. In our country great ignorance prevails, and to prove the utility of the finny tribe for the eradication of malaria and other diseases spread by the agency of mosquitoes extensive field observations are needed. For whatever knowledge we possess on the subject in India we are greatly indebted to the Madras Fishery Department, to Major R. B. S. Sewell, I.M.S., and to Dr. B. L. Chaudhuri.

My attention has been repeatedly drawn to this subject since I have been in charge of the fish collection in the Indian Museum after the retirement of Dr. B. L. Chaudhuri in 1921. We have received enquiries from malaria medical officers stationed in India and Burma and from several other gentlemen interested in the eradication of malaria. The last enquiry, which stimulated me to collect the information detailed here, came from Lieut.-Col. S. R. Christophers, F.R.S., I.M.S., Director of the Central Research Institute at Kasauli. He wrote to Major Sewell, "I have had a certain number of enquiries as to possibility of obtaining mosquito-eating fish. I believe at one time the Bengal Fisheries did supply certain species for trial in anti-malaria work. Possibly there are other sources. Would you very kindly let me know whom I might with advantage communicate with in this matter?" There is no separate Fisheries Department in Bengal now and the Director of Agriculture, who is in charge of the fisheries, has informed me that though the late Fisheries Department used to supply fish that feed on mosquito larvæ it is not possible for the present fishery officers to do the same now.

There is no fishery department in Bihar and Orissa, the United Provinces, Assam, Burma, the Central Provinces or Bombay, and I have ascertained from reliable sources that no organisations exist in these provinces which could undertake to supply larvicidal fishes. There is a fishery department in the Punjab with its head office at Dharmsala. The department has no experience of this business as they have never had any great demand for the supply of larvicidal fish. They do not breed them, but the Warden of Fisheries informs me that he "could arrange to have them collected to meet a limited demand within the Province."

The Department of Fishery, Madras, is the only organisation that can supply larvicidal fish at present. They generally keep in stock *Aplochilus melanostigma*, *Panchax parvus* and *Panchax striatus*. All of these are of proved utility for destroying mosquito larvæ and a few years ago they were extensively used for anti-malarial work. Dr. B. Sundara Raj, Director, Department of Fishery, Madras, has written to me that there is very little demand for larvicidal fish in his province in these days. At my request he has estimated the cost of supplying 100 specimens at a distance of 100 miles from Madras by railway at Rs. 4 only, but if the fish are to be sent to a great distance "a trained attendant will be necessary to look after the fish during the journey, in which case, his railway fare 3rd class to and from his station plus 4 annas *batta* per day will have to be paid." This Department has issued a leaflet giving detailed information and has published an illustrated pamphlet entitled *A Note on Treatment of Swamps, etc.*, by Mr. H. C. Wilson, available at the Fisheries Bureau, Chepauk, Madras. Major Sewell and Dr. Chaudhuri's pamphlet on *Fish of Proved Utility as Mosquito Larvæ Destroyers* is fairly well known among medical people interested in the problem of malaria.

As I have already pointed out, there is a great necessity for extensive field work in India and I hope that when the problem of malaria comes to be seriously considered in this country a fair chance will be given to fish also. There are two definite cases that have come under my personal observation and I think it will not be out of place to mention them here.

In May 1923, the Director-General of Ordnance in India wrote to us for "advice likely to be of use in dealing with the tanks at Cossipore and Ishapore" where numerous ordnance officials live near tanks. I was deputed by the late Dr. Annandale to conduct the enquiry. I visited the Seven Tanks Estate

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at Cossipore on the morning of the 20th of June, 1923, and found that besides the big carps, such as *Catla catla, Labeo rohita* and *Cirrhina mrigala*, there were plenty of small fish of the typical larvicidal genera such as *Haplochilus, Ambassis, Chela* and *Barbus* (*Puntius*) and consequently after a survey of these tanks lasting for an hour and a half, I was only able to find one cast skin of a mosquito larva. To my great disgust I found a quantity of oily substance sprinkled over the surface of some of the tanks, which in my opinion under such circumstances does more harm than good. As I was indisposed, a similar survey was carried out by my colleague Dr. B. Prashad at the Metal and Steel Factory, Ishapur, and Nawabgunj with similar results. In February last a sudden fish mortality was noticed in the Museum tank at Calcutta and all kinds of fish died in hundreds. After this we found several species of mosquitoes breeding in our tank, but we introduced in time specimens of *Haplochilus panchax* and from occasional observations that have been made since then by our Entomological Assistant no mosquito larvæ have subsequently been found in the tank.

There are two fundamental preliminaries which should be carried out to give the larvicidal fish a chance to prove their utility. First the tanks and ponds should be cleared of weeds and overhanging vegetation, and secondly it must be ensured that "all predaceous fishes are removed as well, for otherwise, if you put in supplies of little larvicidal fishes, you will only be providing tasty morsels for these bigger fish. It is best, if possible, to drain out the tank and clean the bottom thoroughly before refilling and putting in small fishes. The murrel, which is one of the worst of our predaceous fishes, burrows in the mud and may have to be literally dug out, before the tank is safe." * I must here regret the action of certain fishery departments in India; these are busily engaged in the propagation of murrel and are introducing it into tanks and ponds all over their jurisdiction. I hope the time will soon come when they will realize the harm that they are doing and have done.

There is one further observation that I have to make on this subject and that is regarding importing larvicidal fishes either from outside India or from one province to another. It is highly desirable that experiments should be carried out on the local species and a selection made from them, for it is quite possible that an imported fish may give up its larvæ-eating propensities under a changed environment. I have in the end to lay great stress on this aspect of the problem and the solution of it lies in an extensive survey of the Indian Empire by a band of experts.

* From a letter of Mr. J. Hornell to Major-General L. R. Kenyon, C.B., Director-General of Ordnance in India.

Since the above was written I have read with great interest a short article by Malcolm E. MacGregor in the columns of *Nature* for September 4th, 1926, regarding *Medical Entomology and the Tropical Field Worker*. The conclusions arrived at are the same as those on which I have laid great stress above, namely, the desirability of the study of the "bionomics, the remarkable habits of some species, the practical methods of demonstrating the breeding-places in Nature, the varied methods of collection, the practical application of control measures in the field," by all sanitarians.

In this connection may I be allowed to mention the willingness with which the officers of the Zoological Survey of India have always co-operated with the medical authorities for the biological investigation of diseases. Drs. Annandale and Kemp carried out an extensive survey of the molluscs of India and its North-Western frontiers in connection with the possible occurrence of schistosomiasis and even at this time (January, 1927) Dr. H. S. Rao, at the request of the Director, Pasteur Institute, Rangoon, is engaged in the Mollusc Survey of the Northern Shan States with a view to study the possibility of the spread of schistosomiasis from the Chinese frontier into Burma. I have the permission of Major R. B. Seymour Sewell, Director, Zoological Survey of India, to say that we shall always be ready to co-operate on such problems where a knowledge of zoological research is a great factor in the investigation of a disease.

Major Sewell has very kindly drawn my attention to a special cablegram that appeared in the *Statesman* of the 29th October, 1926. It refers to a campaign all over the Empire against insects and weed pests advocated by Professor Tillyard, Chief of the Biological Department of the Cawthron Institute of New Zealand. He favours the method of "biological control—by introduction of hostile insects to fight the pests rather than the chemical method of spraying or fumigation, which, he said, was merely temporary and also costly." In my opinion similar biological methods will ultimately be found necessary for the prevention of such diseases of man and cattle where it is known that they are spread through the agency of insects or other animals.

FLOOD AND FLUSH SCHEMES—ANCIENT AND MODERN—WITH REFERENCE TO THE SITE OF THE ANCIENT CITY OF GOUR, MALDA DISTRICT, BENGAL, AND TO THE INCIDENCE OF MALARIA.

By SARASI LAL SARCAR,
Civil Surgeon, Noakhali.

GOUR, the ancient capital of Bengal, during the Hindu reigns and the greater part of the

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Mohammedan dynasty, was situated about 3 miles south of the present town of English Bazaar, the present headquarter station of the Malda District. At present there are ruins of this ancient and once glorious city in the form of old ramparts, big tanks, bundhs, side channels, a few towers, a few ruined or intact buildings, generally mosques. In these ruins there is a demonstration that the ancient city builders recognized very well an important point in sanitation, viz., the flooding and flushing system. In building up this ancient city of Gour this system was all along kept in mind. In another ancient city 5 miles from the town of English Bazaar, known at present as Nimaserai which is not in ruins like Gour the flooding and flushing system of the ancient times is still to a great extent in operation.

The fact of the existence of a flooding and flushing system in the ancient times came to my notice when I interested myself in investigating the cause of the highly insanitary condition of an area of about 60 square miles situated near the town of English Bazaar, which included the site of the old city of Gour. I noticed that there was an artificial canal system in the city of Gour, as well as in the neighbouring area, which flushed the city, irrigated lands for agricultural purposes, and had connexions with the tanks for filling these up and thus bringing annually fresh water into them. A few of these tanks were of a huge size worthy of the ancient capital, the excavation of which was possible in these ancient times because labour was cheap. The irrigation system was on a huge scale, with very big bundhs round very wide areas, into which flood water was admitted for irrigating the land for agricultural purposes and was then let out when this object had been attained. There are still indications in these canals of pucca brick work at places, with grooves for iron gates, and there were sluice gate arrangements in different portions of these canals for regulating the flow of water.

I found afterwards that there is a book relating to these ruins written by Mr. Ravenshaw, a former Collector of Malda, a long time ago. The writer of the book had the opportunity of observing then these canals and bundhs in a less altered condition than at present and he has given in the end of his book a diagrammatic sketch of the canals and bundhs. However, this diagrammatic sketch has departed widely from geographical accuracy as the sketch plan had not been drawn up after an accurate survey.

By appeals through the District Board the interest of the Public Health Department, Bengal, was aroused in the matter. The Engineering branch of the Public Health Department made a thorough local survey of the area. Mr. G. Bransby Williams, Chief Engineer, Public Health Department, Bengal, has very kindly given me permission to publish the sketch plan herein reproduced, which, in a very brief space, indicates the result of this local survey. This map is an accurate geographical representation of a part of the diagrammatic canal system given in Ravenshaw's book and thus has a historical and antiquarian value of its own. To understand this canal system fully the reader may be referred to Ravenshaw's volume.

In the sketch plan the reader will see the map of an area situated between two flowing rivers, the river Mahananda on the North and the river Bhagirathi on the South. There are several bundhs or embankments in this area which are represented by two rows of short parallel lines (like hills in an ordinary map). These bundhs have divided the area into several distinct big plots. These plots are like so many water-tubs and the Chief Engineer has indicated the points through which flood water of the river can be let in and let out into these artificial water-tubs. In bringing forward a new sanitary improvement scheme, the Chief Sanitary Engineer is thus trying to restore an arrangement which was in existence in olden days. Amongst these ruins we find at places the pucca brickwork structure of former sluice gates, and in these brickworks for sluice gates the remains of the grooves for sliding down up or the iron sluice gates can also be seen.

A sanitary survey of the area with a spleen census of the inhabitants was made by Dr. S. N. Sur, Assistant Director of Public Health, Bengal. The following are a few extracts from the report submitted by Dr. S. N. Sur on the 24th October 1921, to his department, which he has kindly permitted me to reproduce.

History.—The area in question is practically surrounded by old ramparts with side channels. These ramparts may be dated back to the period when Gour was in a flourishing condition, i.e., Lakshan Sen's time. The channels alongside these ramparts used to lead silt-laden water from the river Bhagirathi and other rivers when in flood, submerging the area and resulting in bumper crops and good health. About 25 to 30 years ago these channels were dammed at Lohagora and Darbasini to prevent flood water entering the area. This was probably due to damage of crops in 2 or 3 successive years owing to excessive flooding. This has been kept closed since then.

Result.—The result of this closing has been (1) an increase in the unhealthiness of the area; (2) a decrease in the output of crops; (3) want of good drinking water.

Increase of Malaria.—Thirty-one villages were inspected within the non-flooded area and 14 were inspected outside the bundhs—where flooding usually takes place every year. A list is attached herewith which shows that in all the villages in the flooded area—i.e., in

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the villages in which silt-laden water is introduced—every year the spleen indices are much lower. The average spleen index of all the children examined within the non-flooded area is 81.37 per cent. against 18.94 per cent. in the flooded area. This is a marked contrast. There is not a hard and fast line demarcating the two areas, but roughly the 45 villages are divisible into two classes. There are villages outside the non-flooded area which are practically not flooded and in these villages the spleen index is higher than in those which are not flooded.

This interesting report shows how the death-rate has increased and the birth-rate has decreased, the sickness-rate has increased; kala-azar has become prevalent; the yield of crops has become markedly diminished. In villages which were once in a populous condition there are remains of old huts which are now abandoned owing to deaths in the families. There are practically no tanks in these villages. Those which were in existence are placed alongside the channels, which now contain nothing but rain water and are full of vegetation. There is no current in them. These channels have become dangerous breeding places of carrier mosquitoes in the villages. The report suggests that these villages can be improved if silt-laden water be introduced into these channels during the monsoon which is the best breeding season for mosquitoes and when high temperature and humidity in the air is suitable for the growth of parasites in the mosquitoes.

The report records that several zemindars and big landholders objected to opening the bundhs. To quote from the report, "Owing to the failure of paddy crops year after year in some comparatively higher lands they have been turned into mango gardens and the objections to opening the bundhs come from those who have a vested interest in these mango gardens which bring them in a large profit. The owners of these mango gardens have greater influence in the country than the teeming millions who are daily suffering from want of sufficient food and from bad health. The number of deaths here also outnumbers that of births, which means depopulation. Are we to save these villages from depopulation by ignoring the vested interests of the rich, or to help the landlords by ignoring the real needs of the teeming millions?" On the other hand, some of the zemindars and big landholders who have lands at comparatively lower levels are against cutting the bundh, as they believe that thereby too much flood water will flow into their lands and will injure the crops. So here, as many other places in Bengal, the zemindars, big landholders, rich people with vested interests, ignore the real needs of teeming population of their lands.

During the flood time of 1922 the people of the locality, being educated by propaganda work to save themselves from death and destruction by the ravages of such epidemic diseases as malaria and kala-azar, stealthily cut the Lohagora bundh during the night. There was thereby a flow of flood water through a portion of the non-flooded area within the bundhs. This appeared to have a marked effect in improving the health of the locality. The cut portion of the bundh was not subsequently closed, owing to strong public opinion, and probably also because the landholders and zemindars who were in opposition found that they suffered no financial loss.

To test the effect of this flooding on the malarial epidemic the Public Health Department at my request again carried on a careful spleen census of the area in March 1925. The comparative tables of the splenic survey of the villages for the years 1921 and 1925 are here given side by side. In the comparative tables an attempt has been made to tabulate the villages according to the distance from the newly admitted flood water area. It will be seen that there has not only been a marked general reduction in the spleen rates—viz., from 18.8 per cent. to 10.1 per cent. in the flooded area and from 81.3 per cent. to 60.5 per cent. in the non-flooded area—but also that the villages actually flooded or closer to the newly flooded area show better results than the villages situated at a comparatively distant place.

The diminution of the spleen rate in the flooded area shows that a part of the infection of this area came from the non-flooded area. We took a spleen census of a part of both the flooded and non-flooded areas situated at a considerable distance from Lohagora bundh and thus not likely to be influenced by the admission of flooded water through the Lohagora bundh. These spleen figures are given in Table III. From this table it is evident that the general malarial infection in this area is practically the same as before. Moreover, the death-rate per mille of the population does not show much variation during these years.

The statistics for kala-azar cases—shown in Table IV—shows that kala-azar is more prevalent in the non-flooded area than in the flooded area.

Thus we have here tested definitely as in a scientific experiment, the effect of flooding as prophylactic measure against epidemic malaria and have found the result to be quite satisfactory. So it is most desirable that the scheme drawn up by the Chief Engineer, Public Health Department, Bengal, may be introduced into the area for restoring the area to its former healthiness and prosperity.

SUMMARY.

(1) There was a plan of city building in ancient days, utilizing the flood water for

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TABLE I.

Spleen census of children examined in villages in connection with Lohagora and Darbasini bundhs in Malda.

Flooded area.

No.	Names of Villages.	April 1921.										March 1925.									
		F1.	F2.	F3.	F4.	F5.	B.U.	T. S.	N. S.	G. T.	Percentage.	F1.	F2.	F3.	F4.	U.	B.U.	T. S.	N.S.	G. T.	Percentage.
1	Kazigram	..	..	1	..	..	..	1	32	33	16·1	..	..	..	..	..	..	..	40	40	0·0
2	Madapore	..	..	..	..	..	..	..	23	23	0·0	..	..	..	..	..	..	..	38	38	0·0
3	Harishpore	4	5	2	1	2	..	14	16	30	46·6	..	2	..	..	..	..	2	22	24	8·3
4	Serampore	..	3	..	..	..	..	3	17	20	15·0	..	..	..	..	..	..	..	32	32	0·0
5	Baluadanga	1	1	..	1	..	..	3	19	22	13·4	..	..	..	..	..	..	..	7	7	0·0
6	Gayanpara	1	1	1	..	..	..	3	14	17	17·6	..	1	..	..	..	..	1	23	24	4·1
	Jagadishbati	..	2	4	..	..	..	6	18	24	25·0	..	..	1	1	1	..	3	25	28	10·7
8	Satghora	1	2	..	..	..	..	3	30	33	9·09	1	2	1	..	..	..	4	31	35	11·4
9	Mahajamapur	1	..	..	3	3	..	7	28	35	20·0	1	2	1	..	..	..	4	26	30	13·3
10	Kamat	..	3	1	1	..	..	5	26	31	16·1	1	2	1	..	..	1	5	29	34	14·7
11	Manikpur	3	6	3	..	..	..	12	5	17	70·5	2	5	6	1	..	2	16	12	28	57·1
12	Karamaingram	..	4	..	..	..	1	5	26	31	16·1	..	..	1	..	..	..	1	21	22	4·5
13	Jyotiprity	..	2	2	..	1	..	5	17	22	27·7	..	..	..	..	..	..	..	20	20	0·0
14	Baidyanathpur	..	..	..	1	..	..	1	20	21	4·7	1	2	..	..	..	..	3	19	22	13·6
								68	291	359	18·8							39	345	384	10·1

F1 = One finger-breadth.
U. = To umbilicus.
T. S. = Total enlarged spleen.
B. U. = Beyond umbilicus.
N. S. = No enlargement of spleen.
G. T. = Total.

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TABLE II.

Spleen indices of children examined in the villages in connection with Lohagora and Darbasini bundhs in Malda. Non-flooded area.

No.	Names of Villages.	April 1921.										March 1925.									
		F1.	F2.	F3.	F4.	U.	B.U.	T.S.	N.S.	G.T.	Percentage.	F1.	F2.	F3.	F4.	U.	B.U.	T.S.	N.S.	G.T.	Percentage.
1	Pyasbari	..	3	2	..	1	2	8	5	13	61·5	1	2	1	..	..	..	4	23	27	14·8
2	Kashmari	1	4	4	1	1	1	12	11	23	2·0	3	5	3	..	1	..	12	9	21	57·1
3	Panchtikari	2	6	4	1	1	2	16	8	24	66·6	..	6	4	3	1	..	14	13	27	51·8
4	Hanspukar	..	2	9	4	2	3	20	..	20	100·0	..	6	7	4	2	..	19	6	25	76·0
5	Sikari	1	2	5	2	4	6	20	1	21	95·2	..	3	5	2	1	1	12	12	24	50·0
6	Meherpore	5	6	3	2	1	1	18	11	29	62·06	..	4	3	3	1	2	13	11	24	54·0
7	Kanchantar	..	3	6	3	2	4	18	6	24	75·0	2	2	3	1	6	1	10	13	23	43·4
8	Narendrapur	4	5	4	3	8	8	32	1	33	96·9	..	8	9	6	..	1	30	10	40	75·0
9	Ramchandrapur	1	3	1	1	3	2	11	2	13	84·6	2	2	1	2	5	1	8	9	17	47·05
10 & 11.	Kamalabari and Baliachar	5	15	13	5	4	4	46	21	67	68·6	1	5	7	3	3	..	21	15	36	58·3
12	Jadupur	..	4	4	7	6	2	23	3	26	88·4	..	5	6	5	1	..	19	7	26	73·07
13	Banstala	..	8	5	3	1	1	18	5	23	78·2	..	7	6	3	2	2	19	8	27	70·3
14	Kachnahi	1	2	2	4	5	6	20	..	20	100·0	..	3	5	3	3	1	14	7	21	66·6
15	Jadapore	..	3	4	5	3	3	18	1	19	94·7	..	5	5	4	..	1	18	4	22	81·8
16	Singapukur	..	1	3	4	2	..	10	3	13	76·9	2	1	..	..	1	..	3	4	7	42·8
17	Laksmipur	4	6	6	4	3	5	28	7	35	80·0	2	6	1	3	..	2	15	11	26	57·6
18	Damudarpur	4	3	4	1	1	2	15	4	19	78·9	1	6	3	2	1	..	12	9	21	57·1
19	Bagbari	4	4	6	8	7	2	31	4	35	85·6	2	4	3	..	3	..	10	7	17	58·8
20	Ranipukar	1	7	..	2	4	6	20	..	20	100·0	5	6	3	1	..	1	19	3	22	86·3
21	Palasbari	3	..	2	2	2	2	11	..	11	100·0	2	3	..	2	2	1	8	4	12	66·3
22	Nayagram	6	10	11	1	12	8	48	7	55	87·2	2	3	6	1	3	..	14	4	18	77·7
23	Dilalpur	2	3	4	1	1	3	14	1	15	93·3	..	3	11	4	..	1	22	8	30	73·3
24	Uparbazar	1	10	1	3	2	1	18	6	24	75·0	..	5	3	1	1	..	9	7	16	56·2
25	Garkoyla	..	3	6	5	2	2	18	6	24	75·0	2	2	3	2	2	..	10	18	28	35·7
26	Chandipur	1	4	3	3	1	1	13	5	18	72·2	2	6	3	4	1	1	18	10	28	64·2
27	Chakazimpur	1	4	4	1	3	3	16	4	20	80·0	..	3	..	3	..	..	7	4	11	63·6
28	Nabinchak	..	5	3	1	3	1	13	2	15	80·6	..	6	1	2	..	..	9	2	11	81·8
29	Miradah	..	..	4	8	7	4	23	1	24	95·8	1	6	5	3	4	..	19	4	23	82·6
30	Kazigram	..	..	4	4	2	2	12	2	14	85·7	..	..	2	3	1	..	6	..	6	100·0
31	Naodabazar	2	6	3	5	2	2	20	8	28	71·4	1	5	4	1	1	..	12	23	35	34·2
								590	135	725	81·3							406	265	671	60·5

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TABLE III.

Spleen census at the following villages in connection with Lohagora and Darbasini bundhs, Malda.

No.	Names of Villages.	F1.	F2.	F3.	F4.	U.	B. U.	T. S.	N. S.	G. T.	Percentage.
	Flooded area.										
1	Kamal ..	..	3	1	1	..	..	5	26	31	16·1
2	Satghora ..	1	2	..	..	..	..	3	30	33	9·09
3	Manikpur ..	3	6	3	..	..	..	12	5	17	70·5
4	Jagadishbati ..	..	2	4	..	..	..	6	18	24	25·0
5	Balundanga ..	1	1	..	1	..	..	3	19	22	13·4
6	Karmaingram ..	..	4	..	..	..	1	5	26	31	16·1
7	Jyotiprity ..	..	2	2	..	1	..	5	17	22	22·7
8	Baidyanathpur ..	..	..	..	1	..	..	1	20	21	4·7
9	Harishpur ..	4	5	2	1	2	..	14	16	30	46·6
10	Madapur ..	..	..	..	..	..	..	..	23	23	0·0
11	Mahajanpur ..	1	..	..	3	3	..	7	28	35	20·0
12	Srirampur ..	..	3	..	..	..	..	3	17	20	15·0
13	Kajigram ..	..	..	1	..	..	..	1	32	33	3·03
14	Gayanpara ..	1	1	1	..	..	..	3	14	17	17·6
	Non-flooded area.										
1	Singapukar ..	..	1	3	4	2	..	10	3	13	76·9
2	Damudarpur ..	4	3	4	1	1	2	15	4	19	78·9
3	Dilalpara ..	2	3	4	1	1	3	14	1	15	93·3
4	Nayagram ..	6	10	11	1	12	8	48	7	55	87·2
5	Kachnahi ..	1	2	2	4	5	6	20	..	20	100·0
6	Jadupur ..	..	3	4	5	3	3	18	1	19	94·7
7	Sikari ..	1	2	5	2	4	6	20	1	21	95·2
8	Maherpur ..	5	6	3	2	1	1	18	11	29	62·06
9	Hashpukar ..	..	2	9	4	2	3	20	..	20	100·0
10	Panchtigree ..	2	6	4	1	1	2	16	8	24	66·6
11	Narendrapur ..	4	5	4	3	8	8	32	1	33	96·9
12	Pianjbari ..	..	3	2	..	1	2	8	5	13	61·5
13	Laksmipur ..	4	6	6	4	3	5	28	7	35	80·0
14	Kanchitar ..	..	3	6	3	2	4	18	6	24	75·0
15	Baluachar ..	1	4	7	1	2	2	17	4	21	80·9
16	Banstola ..	..	8	5	3	1	1	18	5	23	78·2
17	Jadupur ..	..	4	4	7	6	2	23	3	26	88·4
18	Garkola ..	..	3	6	5	2	2	18	6	24	75·0
19	Chandipur ..	1	4	3	3	1	1	13	5	18	72·2
20	Chakazimpur ..	1	4	4	1	3	3	16	4	20	80·0
21	Nabinchak ..	..	5	3	1	3	1	13	2	15	80·6
22	Miradal ..	..	..	4	8	7	4	23	1	24	95·8
23	Kagzigram ..	..	..	4	4	2	2	12	2	14	85·7
24	Noadabazar ..	2	6	3	5	2	2	20	8	28	71·4
25	Uparbazar ..	1	10	1	3	2	1	18	6	24	75·0
26	Kashimari ..	1	4	4	1	1	1	12	11	23	52·0
27	Kamalabari ..	4	11	6	4	2	2	29	17	46	63·04
28	Ramchandapur ..	1	3	1	1	3	2	11	2	13	84·6
29	Ranipukar .	1	7	..	2	4	6	20	..	20	100·0
30	Palasbari ..	3	..	2	2	2	2	11	..	11	100·0
31	Bagbari ..	4	4	6	8	7	2	31	4	35	85·6

TABLE IV.

Non-flooded area.			*Flooded area.*		
Names of Villages.	Children examined.	Kala-azar.	Names of Villages.	Children examined.	Kala-azar.
Paliachar and Kamalbari ..	36	4	Kamal	34	1
Kashimari	21	2	Jagadishbati	28	1
Kanchantar	23	2			
Ramchandragram ..	17	1			
Narendrapur	40	5			
Laksmipur	26	2			
Ranipukar	22	1			
Palasbari	12	1			
Nayagram	18	1			
Dilalpara (Jadupur) ..	30	1			
Uparbazar	16	1			
Chandipur	28	2			

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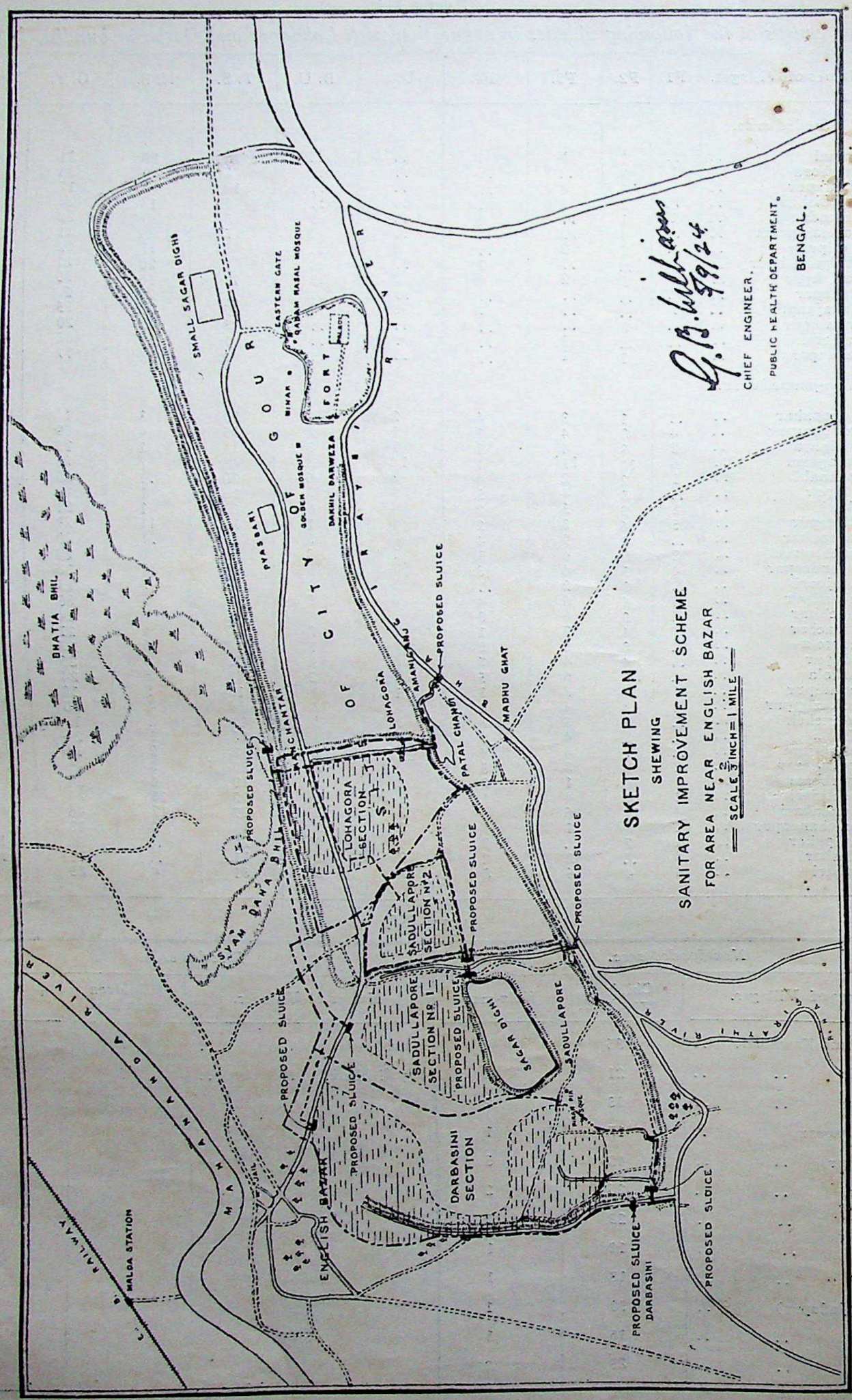

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flooding and flushing, which is worthy of being studied and followed in present times.

(2) A change of policy on the part of the zemindars, big landowners, and rich men with vested interests is necessary for the improvement of sanitation in this Province.

(3) The common people should be led to take the initiative in sanitary measures by propaganda work.

(4) The experiences at Lohagora bundh area prove definitely the good effects of flooding and flushing in checking epidemic malaria.

THE DELETERIOUSNESS OF POTABLE SPIRITS ON THE INDIAN MARKET.

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THE potable spirits offered for sale to the public in India fall under three main categories:—

(1) *Genuine and fully matured spirits.*—Genuine spirits consist of a solution of ethyl alcohol in water, together with sufficient quantities of the by-products of fermentation to confer a characteristic odour and flavour to it. Any one with sufficient experience can distinguish between the three fermentation bases used, namely, cereal grain for whisky, grape juice for brandy, and products of sugar-cane for rum. In old days pot-stills were exclusively used for the distillation of spirits and larger quantities of esters, higher alcohols, etc., were left which were responsible for the characteristic flavour and taste. By storage in wooden casks changes are brought about in the character and amount of these secondary constituents with the result that the flavour is improved. All the matured spirits including whiskies, brandies, etc., are covered by a certificate of age to the effect that they are over three years old. Proof of maturation is by official certificates from the Government of the country exporting, stating the number of years the spirit covered by the certificate has matured in the wood. In Australia all spirits must be stored for two years in bond. In the Union of South Africa three years' bonding is specified for spirits other than gin and liquors. *The Immatured Sprits (Restriction) Act, U. K.*, 1915, laid down that all plain spirits intended for human consumption should be kept in bond for a period of three years before issue. It has not been specified whether the storage should be in wooden casks or not. This act, however, was not passed for hygienic reasons, but was primarily intended as a war measure to restrict the consumption of spirit in the national interest. It does not prevent the use of new spirits in the preparation of compound spirits such as gin, British brandy, etc., provided certain duties are paid. The retail price at which these spirits are sold is over Rs. 84 per dozen bottles, as the storing of spirits for long periods naturally increases the price. In practice most of the good brands of spirits are stored for considerably longer periods than the three years specified by the British and French excise regulations.

(2) *Genuine but immature spirits.*—These spirits are genuine in so far as they are made from the same fermentation bases as class (1). They are generally distilled by means of "patent stills," which are so arranged that an appreciable quantity of the secondary products, but much less than in case of the pot-still, is left behind. Long maturation is therefore not necessary for these spirits. There are quite a large number of such spirits on the market. The whiskies are the produce of Scotland and the brandy that of France, but they are said to be very immature spirits as they could not have been stored for long enough periods to mature owing to their very low price. The selling price of most of these brands is between Rs. 40 to Rs. 55 per dozen bottles.

(3) *Imitation or factitious spirits.*—A very large number of such spirits are now offered for sale. These imitation spirits consist of diluted alcohol which has been so far stripped of the by-products by means of effective "patent stills" that the fermentation base is no longer discernible, and certain odourous and flavouring substances giving the flavour and odour of the genuine spirits are added to it in minute quantities. Two things are required for making imitation spirits; firstly, ethyl alcohol, rectified spirit being generally used, and secondly, flavouring agents, usually added in form of essences. The composition of these essences varies according to the particular spirit that is to be made, and various firms have elaborated their own formulæ. The basic substances in all the essences are esters, peculiar to each spirits, e.g., ethyl butyrate, ethyl acetate and ethyl formate occur in rum; ethyl acetate and ethyl nitrite in whisky; and spirits of nitrous ether and amyl caprionate in brandy and cognac. These imitation spirits by analysis contain much smaller quantities of the by-products than a genuine spirit and therefore have a comparatively mild taste.

Of late years the Indian market has been flooded with many different brands of these imitation spirits—whisky, brandy, rum, etc., imported from Germany and other countries. These spirits are put into very attractive looking bottles with beautiful labels and are considerably cheaper than the "genuine spirits," the sale price being Rs. 20 to Rs. 40 per dozen bottles. They can be sold cheaply because inexpensive fermentation bases such as potatoes, rice, etc., are used in their preparation. On account of their low cost and milder taste the public prefer them and the demand for them appears to be rapidly increasing. The

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question has therefore arisen as to whether these imitation spirits, on account of the cheap cost of their production owing to cheaper raw materials which are used in their manufacture, contain products which are more harmful than those contained in the genuine spirits.

DELETERIOUSNESS OF GENUINE MATURE AND IMMATURE SPIRITS AND IMITATION SPIRITS.

The harmful and toxic effects of spirits were in the past attributed to the by-products. The foundation of this belief rested on the fact that the first distillate from a mash in the case of pot-still liquors was very unpleasant and undrinkable. No one had paid any attention to the large quantities of ethyl alcohol which were present. The question was thoroughly gone into by the Playfair Committee in 1891, who came to the conclusion that immature spirits were not deleterious, but unpalatable. As regards the imitation spirits the same committee concluded that these spirits were no more harmful than genuine spirits. In those days very few of the imitation spirits were in use and only a limited number of flavouring essences were employed. In India the question was examined thoroughly by Sir C. H. Bedford in 1906 with special reference to alcoholic liquors produced in this country as well as of the liquors which were imported. A large amount of experimental work was done and the conclusions drawn were (*a*) that alcohol alone was at least as deleterious as alcohol plus by-products; (*b*) that the by-products, though undoubtedly noxious, in the relatively small quantities in which they are found in even the worst samples of potable liquors have negligible effects; (*c*) that spirit drinking was noxious because of the toxicity of ethyl alcohol; (*d*) that on hygienic grounds there was no reason to discriminate between most of the good quality of imported spirits, the cheap imported spirits, and the factitious Indo-European spirits. Cheaper spirits distilled from the cheap fermentation bases were not more deleterious than the better class spirits. The Royal Commission on potable spirits in 1909 confirmed in the main all the findings of the Playfair Committee and the Bedford report. Alcohol and not the by-products was chiefly responsible for all the toxic effects produced by potable spirits. Cheaper spirits distilled from cheap fermentation bases were not deleterious because of the by-products they contained, but because excessive quantities of alcohol were consumed which produced harmful effects.

It is obvious from this that while the toxicity of ethyl alcohol and the by-products produced during the course of distillation of potable liquors, which are responsible for the taste of the liquor, has been fully investigated, the toxicity of the essences used for purposes of flavouring the imitation spirits and the toxicity of the imitation spirits now largely consumed in this country has not been thoroughly investigated. Further, I am unable to find any experimental data to show whether the immature genuine spirits were any more toxic than the mature genuine spirits. As this matter is of great importance from the point of the health of the public, a large series of experiments were conducted at the instance of the Government of India to settle these points.

EXPERIMENTAL EVIDENCE.

A large number of animals, mostly cats, were used for this investigation. Batches of animals were kept in large cages in which they could move about freely and were given a routine diet consisting of boiled meat, fish and rice. They were carefully weighed before and after the experiments and watched for the appearance of any untoward symptoms. At the completion of the experiment the animals were killed and a careful post-mortem examination was made and any changes produced were recorded. Parts of all the important organs such as the liver, kidney, suprarenals, stomach, intestine, pancreas, lungs, etc., were removed for microscopical examination. This involved a very large amount of work and I am very grateful to my colleague Lieut.-Col. H. W. Acton, I.M.S., Professor of Pathology, Calcutta School of Tropical Medicine, for giving his expert opinion on the pathological findings. Two separate sets of experiments were arranged.

Experiments; Group A.—The first group were carried out in order to determine the toxicity of certain essences used in the preparation of imitation spirits now on the market. These included essences for preparing imitation whisky, brandy, gin and rum, manufactured by well known British firms. I used these in all my experiments, taking them as typical examples of the essences used commercially in preparation of imitation spirits.

(1) Ten per cent. solutions of the essences dissolved in 42 per cent. of alcohol (by volume) in water were given intravenously to intact animals under experimental conditions. There was no appreciable effect on the heart, blood pressure, respiration, or other organs of these animals. The proportion of the essence of whisky in ordinary imitation whisky is 1 of the essence in 5,333, so that when such spirits are consumed and circulate in the blood in much lower concentrations the effects produced will be negligible. Perfusion of the isolated mammalian heart, which is very susceptible to toxic substances, with 1 in 2,500 to 1 in 20,000 dilutions of the essence had only a slight depressing effect. In the human body these essences would not probably circulate in stronger concentrations than 1 in 100,000 to 1 in 150,000 and the chances of any direct action on this organ are negligible.

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(2) Large quantities of the essences such as 30 to 60 minims in 4 c.c. of rectified spirit (B. P.) diluted 42 per cent. by volume were given to a series of animals by the stomach tube. No toxic symptoms either immediate or remote were noticed. In the dilutions in which they exist in the potable spirits their effect on the gastro-intestinal tract would be non-existent. Subcutaneous injections of pure essences in doses of 15 to 30 minims in a solution in diluted rectified spirit produced neither any general nor local, immediate or remote, effects.

(3) The lethal dose of ethyl alcohol to cats was 7 c.c. to 9 c.c., whether the essences were added to it in 1.0 c.c. doses or not. Symptoms such as intoxication, jaundice, and general toxæmia were not greater in the case of cats which were given alcohol plus essence, than in those which were given alcohol alone.

(4) A series of cats were fed daily for a period of one month (*a*) with 4 c.c. of alcohol largely diluted; (*b*) with the same amount of spirit plus essences in a concentration of 1 of essence in 250 to 500 parts of diluted alcohol. The animals of both batches were carefully watched during the experiment. They all lost weight and became thin and emaciated. At the end of this period these animals were killed and a thorough examination, both macroscopic and microscopic, was made of all the organs. Both groups showed marked gastro-intestinal catarrh and apparent changes in the abdominal organs. The histological changes, chiefly consisting of fatty infiltration, cloudy-swelling, fatty degeneration and increased formation of interstitial tissue, were confined chiefly to the liver and the kidneys. These were no more marked in those animals which were fed on rectified spirit plus essences than in those which received rectified spirit alone. As a matter of fact the animals which had the essences in addition showed a milder degree of pathological changes than those which had alcohol alone.

Experiments; Group B.—Thirteen specimens of the common potable spirits, including those considered to be genuine and fully matured, genuine but immature, and imitation or factitious spirits, were bought through the courtesy of one of the firms of wine and spirit importers and my investigations were mainly confined to these samples. Before proceeding with animal experiments all these samples were chemically examined with a view to determine, firstly if any methyl alcohol was present, and secondly to find out the exact quantity of ethyl alcohol present in every specimen, so that the dosage of each brand could be calculated exactly in terms of ethyl alcohol per kilo body weight of animals. The following table gives the result of the analysis kindly carried out by Mr. Jenks, the Chemical Examiner for Customs and Excise.

TABLE I.

13 *specimens of potable spirits (in bottle) offered for sale in the Indian market with original seals and capsules.*

No.	Description.	Real strength, alcohol % by volume (v/v)	Denige's test for methyl alcohol.	REMARKS.
1	Scotch Whisky	43·25	Negative	Matured.
2	Ditto.	44·24	Ditto.	Ditto.
3	Ditto.	44·85	Ditto.	Ditto.
4	Ditto.	43·37	Ditto.	Considered immature.
5	Ditto.	43·37	Ditto.	Ditto.
6	Ditto.	43·14	Ditto.	Ditto.
7	German Whisky	43·70	Ditto.	Imitation spirits.
8	Ditto.	43·76	Ditto.	Ditto.
9	Brandy French No. 1	47·13	Ditto.	Considered matured.
10	Ditto. No. 2	44·39	Ditto.	Ditto.
11	Ditto. No. 1	45·93	Ditto.	Ditto.
12	German Brandy	44·10	Ditto.	Imitation spirits.
13	Java Brandy, bottled in India	43·94	Ditto.	Ditto.

N.B.—The remarks' column shows the category under which these specimens were classed by commercial experts.

The effect of the different brands was then tested on animals. The results were as follows:—

(1) Intravenous injections of these spirits in intact animals in doses ranging from 0.1 to 1.0 c.c. produced exactly the same effects on the heart, blood pressure, respiration, etc. There is no reason to suppose that their behaviour will be different when they enter the circulation through the alimentary canal and circulate in very much smaller concentrations. On the isolated mammalian heart also in dilutions of 1 in 5,000 to 1 in 20,000 the depressing effects of all the different samples were equal. Further, the effects produced did not differ materially from those given by similar concentrations of pure ethyl alcohol. The lethal doses of all brands of spirits to cats were about the same and in terms of alcohol present corresponded to those obtained in the experiments in Group A (3).

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(2) A large series of animals were divided into three batches and were fed for 10 days on doses of these spirits calculated at 1 c.c. of ethyl alcohol net per kilogram body weight of the animal. One batch was put on the genuine matured spirit, another on genuine but immatured spirits, and the third on imitation spirits. The dose selected was purposely small as cats are particularly susceptible to alcohol. Ten days was selected as the period during which this dosage was to be administered, as this period was found to be quite sufficient to produce changes in the animal organism without rendering the animal too weak and emaciated. All the animals lost in weight to the extent of 15 to 25 per cent. due in all probability to the general gastro-intestinal catarrh that was always set up very rapidly. After 10 days the animals were killed and all their organs were carefully examined macroscopically and microscopically. The organs chiefly affected were the gastro-intestinal tract, the liver and the kidneys; the changes were fatty infiltration, fatty degeneration, cloudy swelling, and increase of interstitial tissue. All the three groups of animals showed these changes in equal proportions.

(3) Two batches of animals were fed on large toxic doses of genuine fully matured whisky and brandy and two with imitation whisky and brandy. The doses were calculated on the basis of 4 c.c. of alcohol per kilo body weight. The average number of days of life, the loss in weight and the pathological finding, in different organs such as the kidney, liver and gastro-intestinal tract were the same.

DISCUSSION.

From the first group of experiments one is justified in concluding that the essences used for making factitious potable spirits now on the market are not toxic substances. As the imitation spirits are made from rectified spirit by adding small quantities of the essences to give the peculiar flavour of the liquor, it is reasonable to conclude that the imitation spirits are not deleterious because of the presence of these essences. The other important constituent is ethyl alcohol, which is common to both imitation and genuine spirits. From the analysis of the data obtained from the experiments in Group B one is justified in concluding that the toxic effects on animals of the three classes of spirits, i.e., genuine and mature spirits, immature genuine spirits, and imitation or factitious spirits are about equal.

Further, there is ample evidence to show that the fermentation base is not an important factor in the deleteriousness of potable spirits. Potato-spirits are not more deleterious than the sugar spirits or the grain spirits. Nine-tenths of the spirits consumed in Germany is potato-spirit, in Great Britain grain spirits are consumed, and in France and India sugar spirits are drunk. It cannot be imagined that potato-spirits are harmless to Germans but deleterious to an Englishman or an Indian, whether labelled whisky, brandy or gin: or that rectified grain spirit is harmless to all when taken as gin, but is deleterious when sold as cheap Scotch or imitation whisky. Sir Lauder Brunton, giving evidence before the Playfair Committee, suggested that the spirit distilled from rotten potatoes may contain tasteless alkaloids and other dangerous ingredients but the Royal Commission of 1909 failed to find any evidence of the presence of poisonous ingredients in such distillates. Gin containing one of these essences is largely consumed and no fault has been found with the British brandy in whose composition these essences occur. Further, the quantities of these essences in the imitation spirits is very small and no case of poisoning has been recorded from them. The higher alcohols and esters are present in minute quantities and the colouring matter is almost always the one used in genuine spirits (caramel), and also a duty approaching 1,000 per cent. of their value is staked on the quality of these articles.

From these considerations and from the data I have gathered from my experiments, I am justified in drawing the following

GENERAL CONCLUSIONS.

(*a*) The essences used in the preparation of imitation spirits are not deleterious to the animal organism, even when consumed in much larger quantities than those present in these spirits.

(*b*) Genuine and fully matured, genuine immature, and imitation or factitious spirits are equally deleterious to animals.

(*c*) Ethyl alcohol is mainly responsible for the deleterious effects of potable spirits; the by-products occur in such small quantities that their effect is negligible.

(*d*) The danger of cheap spirits (immature genuine, and imitation) lies in the fact that the consumer takes larger quantities, partly because of their low cost and partly because of their milder taste.

I gratefully acknowledge the help and advice given to me by Lieut.-Col. H. W. Acton, I.M.S. and Mr. R. L. Jenks in the course of this research. To Drs. Premankur De, Khem Singh Grewal and N. K. Basu I am indebted for much help in the experimental part of the work.

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FURTHER OBSERVATIONS UPON "DERMAL LEISHMANOID."

By ASSISTANT SURGEON BIRAJ MOHAN DAS GUPTA, L.M.P.,

Assistant Professor of Protozoology, Calcutta School of Tropical Medicine.

A VERY considerable number of cases of this condition are now referred to this department for diagnosis from Colonel Acton's skin outpatient clinic at the Calcutta School of Tropical Medicine since attention was first drawn to it, and at least two fresh cases are seen every week.

In the early stage of the disease, when the lesions consist of white, non-pigmented tiny spots on the skin, it is very difficult to find parasites in the affected tissue. In all I have examined about ten such cases, and in only one—and then only after prolonged search—was a leishmania parasite discovered in the direct smears. On the other hand if a tiny fragment of infected tissue be snipped out and sown into NNN medium, a positive culture of *L. donovani* flagellates usually results. In one patient, for instance, although prolonged examination of three smears directly from a lesion had proved negative, cultures were positive.

On five occasions cultures were contaminated by staphylococci or by a stout organism resembling the "bottle bacillus" associated with acne. This was also present in the smears from the crushed tissue, although all precautions had been taken to sterilise the skin before a fragment of the growth was snipped off.

Later, when the granulomatous nodules have developed, the examination becomes very much easier: a tiny bit of the nodule is excised, crushed in saline, smeared on a slide, stained, with Leishman's stain and examined in the usual way. The smears thus prepared almost always show *L. donovani*—and not infrequently in very considerable numbers. Cultures can also be taken from the nodules in a similar way to those taken from an oriental sore. The skin over the nodule is sterilised with tincture of iodine and the material for inoculation obtained by puncturing it with a small hypodermic syringe fitted with a needle of relatively large bore; e.g., a Collin's 1 or 2 c.c. syringe fitted with a 5 c.c. needle has been found preferable to any other kind. Aspiration is made, and the material obtained sown directly into the water of condensation of NNN medium and incubated at 22°C. for 5 or 6 days. Cultures taken by this technique have never gone septic and have invariably been positive.

In a previous communication I have pointed out that the condition of "dermal leishmanoid" is a purely cutaneous one and never associated with visceral infection, the cultures of the blood—and in a few cases of liver juice as obtained by liver puncture—remaining sterile and negative for parasites. A different finding has recently been made, however, and brief notes on the case may not be without interest.

The patient, a Hindu lady, aged about 20 years, developed granulomatous nodules on the nose. These were first noticed about five months before she came under examination, when they looked like minute papules. Prior to this, she stated that tiny leucodermic spots had appeared on the same region and on the forehead, and that these leucodermic spots had disappeared without treatment with any medicament. She had been suffering from fever for the past eight months or so, and was treated with occasional doses of quinine without benefit. The spleen and liver were not palpable, and the aldehyde reaction was negative.

Blood culture, taken from a vein in the antecubital fossa, gave a rich growth of *L. donovani* flagellates upon the 11th day of culture. It is therefore clear that this patient had kala-azar simultaneously with "dermal leishmanoid."

Several cases of "dermal leishmanoid" have been reported following after an attack of kala-azar, and others who came from endemic areas of the latter disease, but who give no history of previous kala-azar or of fever or enlargement of the spleen or liver. In these culture of the venous blood from the antecubital fossa has hitherto been with negative results, and where liver puncture juice has been cultured the results have also been negative.

The question now arises as to whether the parasite of "dermal leishmanoid" will give identical serological reactions with *Leishmania donovani*, and this problem is now under study—using the technique adopted by Noguchi. Whatever the exact pathogenesis of "dermal leishmanoid" and its exact ætiology, the condition is clearly very far from uncommon in Bengal.

THE DIFFERENTIAL DIAGNOSIS OF SMALL-POX AND CHICKEN-POX.

By J. W. TOMB, O.B.E., M.D., D.P.H.,

Chief Sanitary Officer, Asansol Mines Board of Health.

THE differential diagnosis of chicken-pox and small-pox is of the utmost importance from a public health point of view, but experience in the Asansol Mining Settlement has shown that few medical practitioners in this part of Bengal are capable of making the diagnosis correctly. A not dissimilar state of affairs would also appear to exist in general elsewhere. The reason for this is that the text-books fail to lay sufficient stress on the fact that the only point in the differential diagnosis of the two diseases in which no ambiguity lies is the period of time which elapses between the onset of fever and the appearance of the characteristic "vesicular" eruption which is the common and striking feature of both diseases.

The Asansol Mines Board of Health was created by the Government of Bengal in 1913 "to prevent the outbreak and spread of dangerous epidemic diseases," one of the diseases referred to being small-pox, periodical

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outbreaks of which had for many years inflicted severe economic loss on the coal industry of the province. On the active establishment of the Mines Board of Health it became obligatory on colliery managers within the Mining Settlement to give immediate notification to the Board of all cases of small-pox occurring on their collieries, but it was soon discovered that this order was ineffective, as the colliery doctor babus secured its evasion by the simple procedure of diagnosing *all* cases of fever accompanied by a vesicular eruption as "chicken-pox" and reporting the cases as such to their managers, obstinately refusing to recognise the existence of small-pox. A further order was thereupon issued by the Board calling upon colliery managers to notify to the Board all cases of sickness accompanied by a vesicular eruption as "small-pox." In consequence of this order all cases of chicken-pox as well as of small-pox became notifiable to the Board as "small-pox," and it therefore became necessary to have some means of differentiating easily and readily between the two diseases, not only for purposes of accurate record but for the guidance of the Board's outdoor sanitary staff in their work of disinfection, isolation and revaccination. In the printed forms provided by the Board for the notification of small-pox two columns were then inserted—one showing the "Date of onset of fever" and the other the "Date of outbreak of eruption."

From the analyses of many hundreds of such notifications, together with a thorough investigation of the symptoms and history of each individual case it became evident that there were two distinct diseases, one possessing in general the clinical characteristics of chicken-pox—in which a vesicular eruption appeared *within* 24 *hours* of the onset of fever (sometimes even preceding the fever), and the other possessing in general the clinical characteristics of small-pox—in which the vesicular eruption did not appear until *after a period of at least* 48 *hours* from the onset of fever—the period varying between 48 and 96 hours in extreme cases, but generally lying in the neighbourhood of 72 hours. It was also found that no vesicular eruption ever appeared between the 24th and 48th hour after the "onset of fever." It was therefore impressed upon the outdoor staff that in future in investigating cases of fever accompanied by a vesicular eruption careful enquiry was to be made on what date the patient first had fever, and after what interval from the time of the onset of fever the vesicular eruption appeared, and action taken accordingly. During the cold weather of the year 1925-26 small-pox was widely epidemic throughout Bengal, and the Mining Settlement of Asansol was threatened with a serious invasion of the disease which was held in check by the vaccination and revaccination of a large number (84,570) of the total inhabitants of the Settlement (Pop. 329,353). Advantage was taken of the opportunity thus offered to carry out an experimental investigation into the validity of making the differential diagnosis between chicken-pox and small-pox by the time interval elapsing between the onset of fever and the outbreak of eruption alone.

During this period 65,795 revaccinations of the general inhabitants of the Mining Settlement were performed, of which 51,012 were successful, giving a general "success" rate of 77 per cent.

In addition to these—at the same time and with the same supplies of lymph—94 volunteers of varying ages were revaccinated who had suffered during the preceding 12 to 24 months from fever accompanied by a vesicular eruption which appeared within 24 hours of the onset of fever and had therefore been diagnosed as *chicken-pox*. Of these 94 revaccinations 70 were successful, giving a rate of success of 75 per cent. Of these 94 cases 20 had been revaccinated successfully within a period of 5 to 10 years previously.

One hundred and eight volunteers of mature age were also similarly revaccinated, who had suffered during the preceding 12 to 24 months from fever accompanied by a vesicular eruption which appeared after 48 hours of the onset of fever and had therefore been diagnosed as *small-pox*. Of these 108 revaccinations none were successful. Moreover, none of these adults had ever at any time been successfully revaccinated.

The conclusion was therefore drawn that the absolute immunity shown by the latter group to vaccinia was due to their recent protection with variola, the 94 cases that had been diagnosed as chicken-pox showing practically the same degree of non-immunity to vaccinia as the rest of the general population.

It is therefore claimed that the differential diagnosis of chicken-pox and small-pox by means of the time interval which elapses between the date of the onset of fever and the date of the outbreak of the characteristic eruption is simple, accurate and unambiguous.

In cases where (as has recently been alleged in England) a vesicular eruption is found to occur unaccompanied by fever or malaise of any kind (the so-called "mild small-pox" or "alastrim") diagnosis by this method is obviously impossible; but such cases if they ever do occur are of no importance from a public health point of view since they cause neither morbidity nor mortality.

Moreover, no record of the derivation of a severe from a mild outbreak of small-pox could be discovered by Chapin* in the United States of America.

* Public Health Reports, Washington, 24th December, 1926.

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A table is appended showing the results of revaccination in the three groups referred to, as well as the results of primary vaccination in a fourth group of cases carried out at the same time.

	Total number of re-vaccinations.	Number of successful re-vaccinations.	% Rate of success.	Total number of primary vaccinations.	Number of successful primary vaccinations.	% Rate of success.
General population	65,795	51,012	77%	18,775	18,773	99·9 %
Cases diagnosed as "Chicken-pox" ..	94	70	75%	0	0	0
Cases diagnosed as "Small-pox ..	108	0	0 %	0	0	0

SUMMARY.

In the Asansol Mining Settlement the differential diagnosis of chicken-pox and small-pox is simply and accurately made by ascertaining the time interval which has elapsed between the onset of fever and the outbreak of the vesicular eruption.

This period in the case of chicken-pox never exceeds 24 hours. In the case of small-pox the interval always exceeds 48 hours.

65,795 inhabitants of the Asansol Mining Settlement were revaccinated during the financial year 1925-26, of whom 51,012 were successfully revaccinated, giving a rate of success amongst the general population of 77 per cent.

94 cases of chicken-pox (of recent incidence) as diagnosed by the time interval elapsing between the date of onset of fever and the date of outbreak of eruption were revaccinated at the same time, amongst whom the rate of success was 75 per cent.

108 cases of small-pox (of recent incidence) as diagnosed by the same method were also revaccinated at the same time, amongst whom the rate of success was nil.

CONCLUSION.

The differential diagnosis of chicken-pox and small-pox by means of the time interval elapsing between the "date of onset of fever" and the "date of outbreak of eruption" is accurate, simple and unambiguous and should be adopted in India by all Public Health authorities since any intelligent subordinate can thus make the diagnosis quickly and accurately.

LATHYRISM IN THE GILGIT AGENCY.

By LOUIS H. L. MACKENZIE,
MAJOR, I.M.S.,
Civil Surgeon, Hazara.

LIEUT.-COL. R. MCCARRISON'S "Notes on Lathyrism in the Gilgit Agency" published in the *Indian Journal of Medical Research*, Vol. XIV, No. 2, last October prompt me to send in such scanty notes as I have made on the same subject.

I was Agency Surgeon in Gilgit from 1921 to 1924, but it was only during my last year there that I became aware of the existence of lathyrism in the Agency.

The manner of my "discovery" was as follows:—

A member of the Gilgit scouts when at Gilgit for annual training was referred to hospital for examination as to his fitness for service. I was on tour at the time, but the case was mentioned to me on my return. The Assistant Surgeon told me that the man was pronounced unfit on account of paralysis of the legs, the symptoms being, he stated, those of a well known local disease supposed to be incurable. Further enquiries elicited the following information concerning a condition which is fairly widespread and popularly recognized but, owing to its reputation of being incurable, is never in my experience seen among hospital patients.

The essential feature of the disease is spastic paralysis of the legs.

It occurs in males—adults and children—but not in women, and is attributed to the eating of *gharash*. The condition occurs only in those whose diet consists of *gharash*, grown in newly cultivated land, the same plant after a few years' cultivation apparently losing its power to cause the disease.

Sufferers were stated never to recover but never to die from any state attributable to the condition. The victims are known locally as *gharashlang*, i.e., lame from *gharash*.

I visited some villages where the condition was reported to be common and saw all the available sufferers. The disease I found on enquiry, is attributed to a diet of *gharash* alone. If mixed with wheat, etc., it is said that no symptoms occur. Further, it was alleged that the disease occurs only when the *gharash* is grown on virgin soil, and the liability to it, even with an exclusively *gharash* diet, dies out in the course of a few years.

All the cases I saw—about a dozen—were males, and the age of onset varied from 5 to 55 years.

In most cases the onset was sudden, in other cases there was a vague history of some preliminary symptoms.

Some improvement was usually said to occur spontaneously in the course of years, but never

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complete recovery. The general health remained good. On examination there was more or less marked spasticity of both thighs and legs.

Wasting was not noticeable.
Knee jerks as a rule were exaggerated.
Sensation, normal.
Bladder and rectum functioned normally.

A specimen of *gharash* which I sent to Major R. N. Chopra, I.M.S., of the Calcutta School of Tropical Medicine was identified by him as *Lathyrus sativus*.

These notes, so far as they go, correspond in the main with Colonel McCarrison's observations at Matamdas. The villages where I saw my cases were in Nagar territory between Chalt and Nilt, some 25 miles from Matamdas. I was led to believe that the condition was known throughout the Agency as liable to occur in newly cultivated areas. The immunity of females is generally accepted and appears remarkable.

Unfortunately I had no further opportunity of investigating the condition before leaving the Agency.

[*Note.*—Lieut.-Col. R. McCarrison, I.M.S., to whom Major Mackenzie's notes have been submitted, writes, "Major Mackenzie's notes on lathyrism in Gilgit are of interest. They emphasize a point, referred to in my note on lathyrism in the Gilgit Agency, which may be of scientific interest; the belief that *garash* (*Lathyrus sativus*) is only harmful when grown on virgin and barren soil. The other point of great interest, to which I also referred, is the peculiar sex incidence of the condition. For the rest, the condition as reported by Major Mackenzie is identical with 'lathyrism' as I have known it in Gilgit."—EDITOR, *I. M. G.*]

A STUDY OF THE INCIDENCE OF TUBERCULOSIS IN CALCUTTA AS EVIDENCED BY THE VON PIRQUET CUTI-REACTION.

By B. N. GUPTA, O.B.E., M.B.,
and
HIRAN K. DUTT, M.B.,
Laboratory, Howrah General Hospital.

TUBERCULOSIS has now been acknowledged as spreading daily in cities like Calcutta, and its prevention presents a difficult problem both to the public and the profession. In Calcutta alone the number of infected cases is more than 10,000 at the moment and in Bengal the number of cases must be a lakh at a moderate estimate. Extensive experimental investigations as to the nature of the disease and the adoption of suitable preventive measures have considerably brought down the incidence of the disease within recent years in several countries in Europe. The importance of the study is now being felt by the leading members of our profession who think about the future of our race, for this fell disease invalidates or carries away individuals when they are most likely to be useful to society (i.e., youths).

In carrying out von Pirquet's test to ascertain the incidence of the disease we were greatly helped by Col. D. P. Goil, I.M.S., for kindly placing at our disposal the District Jail. We are also grateful to Dr. A. C. Ukil of the Clinical Research Association for supplying us with samples of tuberculin and antigens for the compliment-fixation tests. We have used two kinds of tuberculin in our investigations, namely (1) Tuberculin Diagnose of Behringwarke, and (2) Tuberculin Brute of the Institut Pasteur, Paris. These appeared to us after several trials to have no differences as regards the results. The method employed was the standard method of putting a drop of tuberculin on the skin of the forearm, with a drop of carbolised saline as control, after previously cleaning the part first with soap and water and then with rectified spirit. A few scratches were then made through the drops with a sharp bayonet-shaped needle. Care was always taken to prevent the appearance of blood—the idea being to just open out the lymph spaces. We have found that this method of doing the test was far superior to the method of scratching with a scalpel or a vaccination lancet, as there is always a sort of uniformity in the procedure and a lack of inflammatory reaction consequent on vigorous scratching. We have endeavoured to study the incidence of the reaction according to age and according to profession wherever possible. The age factor appeared to us to be of great importance, as we wanted to know the percentage of children infected and the age of the highest incidence. Universal testing of children for the prevalence of tuberculosis is a measure which commends itself strongly. All who react are known to be infected. But it is fraught with difficulties as the parents strongly object to it, so our statistics are limited to children who visit the outdoor clinic or who are in the hospital (hospital classes), and the children in the free primary schools of the Calcutta Corporation who come from the poorer classes. The incidence among the middle class and well-to-do is considered to be lower than amongst the former classes.

We have endeavoured to find out the incidence among the children in infected houses, but have been successful in only three instances. The results are interesting in that in one house where there had been five deaths from tuberculosis, out of nine children eight were tested and four reacted to tuberculin. The two sons of a father dying of tuberculosis—aged 14 and 11 respectively—both reacted strongly to the test. Two babies aged 11 months, and 13 months and a child of 2½ years failed to react. A baby of 1½ years suffering from broncho-pneumonia was not

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tested. In a second house there had been two deaths from tuberculosis and there were three children, of whom a boy aged 7 years reacted strongly to it. On examination the first author detected that the boy had a few slightly enlarged glands on one side of the neck and an irregular mass about the size of a small orange in the left hypochondriac region which did not move with respiration. There was no history of fever lately, though the boy had suffered from irregular fever when he was about 3 years of age. In a third house there had been two deaths from tuberculosis of which one was definitely diagnosed as pulmonary, the other was of unascertained anæmia and emaciation with diarrhœa, put down by the attending physician as tubercular. A third individual is suffering at present from pulmonary tuberculosis. There are two children in the family, aged 5 and 3 years, and neither reacted to the test. But all the adults with the exception of an old lady reacted to tuberculin. The two male members, both watch-repairers by occupation, reacted strongly. The high percentage in this particular house was dependent upon the social status of the individual. Watch-repairers are poorly paid and have to work hard throughout the day. These two are also addicted to alcohol and both are poorly built. The family live huddled up together in the lower flat of a small ill-ventilated house. It is a curious thing to note how the children escaped infection.

The cuti-reaction by the tuberculin test is a simple allergic phenomenon. It is an evidence of hyper-sensitiveness to the tuberculous toxin which can only be acquired after an individual has had to face an infection. From our statistics it is evident that we did not get a positive reaction in the first 5 years of life in the few cases we examined, and the percentage of positive reactions grew with the increase of age. The child is perhaps more susceptible than the adult but the defensive factors being weak it easily succumbs to infection. The death-rate of children from tuberculosis, especially from tubercular meningitis, if properly investigated—will alone clear the doubts about the incidence among them.

We have usually applied the tests only once in each individual. But in the jail we have used on some positive cases the intradermal method of inoculation to find out the degree of hyper-sensitiveness. We made different dilutions of tuberculin as 1/1,000,000th, 1/100,000th, and 1/10,000th mgm. With a tuberculin syringe and a very sharp needle supplied by Parke, Davis & Co. with their tuberculin syringe—we made three inoculations in the forearm after sterilizing the skin with alcohol and wiping it dry. The inoculations are made from the lowest dilutions first and the others in a vertical line upwards about one inch apart. Previous to the tuberculin we also inoculated an equal amount of saline as control. The dose used for all cases was 0.1 c.c.

Our observations with this method led to some very interesting results. All those who had a strongly positive cutaneous reaction reacted with all the three doses of tuberculin, with the general symptoms of malaise and a slight rise of temperature. The others who were positive with the scarification method gave varying results. Some reacted to all three, some with the second dilution, and a few only with the first. In this connection we would mention that we always employed this test to find out the degree of hyper-sensitiveness of a certain tubercular patient before giving him tuberculin as a curative; for from the reaction obtained, we used to ascertain the preliminary dose suitable for the individual.

Out of 1,000 males examined, 319 reacted to tuberculin, making the percentage of positives 32. Of the few females examined, most of them were between 30 and 60 years of age, and the percentage of positives amongst them was 37 per cent.

Result of von Pirquet's test according to age.

Age.	Number examined.	Number Positive.	Percentage
3 days — 5 years ..	20	Nil	Nil
6 years—10 years ..	280	50	18
11 „ —20 „ ..	210	60	28.5
21 „ —30 „ ..	470	150	32
31 „ —40 „ ..	310	150	48.4
41 „ —50 „ ..	110	70	63.6
51 „ —60 „ ..	30	21	70
Total ..	1,330	501	

Result of von Pirquet's test in 3 tubercular houses.

		Number examined. Adults.	Result positive.	Number examined Children below 12.	Result positive.
First House ..	Male	4	2	8	4
	Female	6	5	0	0
Second House ..	Male	6	4	3	1
	Female	3	2	0	0
Third House ..	Male	2	2	2	Nil
	Female	6	5	0	0

The percentage of positives in Bengali and other castes:—

Bengalis ..	..	.. 37% Positive.
Other castes ..	..	.. 26% „

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Classification according to occupation.

Cultivators	30%	Positive.
Police	33%	"
Coolies	33%	"
Hawkers	37%	"
Mill-hands	50%	"
Servants	50%	"
Mistries	57%	"
Carters	66%	"
Brewers	100%	"
Sweepers	100%	"
Printers	100%	"

Though of course one cannot draw any definite conclusions from these figures, as all the classes were not equally represented, still the higher percentage amongst printers, carters, and sweepers is worth noting. The overcrowding and exposure to which carters and sweepers are liable make them especially prone to tuberculosis. In the case of printers the conditions of the influence of occupation on the causation of the disease as laid down by the late Sir William Osler are best fulfilled, such as "insanitary surroundings, exposure to dust, close confinement, and long irregular hours and low rates of wages."

In conclusion, we beg to state that we had to face innumerable difficulties in making the tuberculin survey by means of the cutaneous reactions. Custom and prejudice stood in our way. We know from statistics that the prevalence of the disease is greater here in women than among men. It is partly due to the *purdah* system, early child-bearing, and other social evils, but we could not try the tests on a sufficient number to find out the incidence of the disease among them. The few cases we got were from the outdoor dispensary, indoor patients, and a few from the houses of some liberal-minded patients. This is a sort of beginning and we hope to carry on our investigations in the future.

THE CAUSAL ORGANISM OF CHOLERA.

By F. J. PALMER, F.R.C.S.I.,
LIEUT.-COL., R.A.M.C. (Retd.),
Binnakandy, Cachar, Assam.

CHOLERA is almost universally attributed to the cholera vibrio, first discovered by Koch in 1883, and accepted, though not entirely without faint murmurs of questioning, since.

A doubt seems always to have existed as to the actual rôle played by the cholera vibrio, partly owing to the fact that a disease resembling cholera cannot be produced in experimental animals.

Whilst to a certain extent this doubt persists, and is reflected in textbooks, in other respects the teaching of these textbooks is dogmatic enough. All refer to the enormous number of comma bacilli present in films made from the stools, and the "fish in a stream" appearance is alluded to in Manson, etc. Muir and Ritchie mention that "in the characteristic rice water fluid in the intestines they occur in enormous numbers, almost in pure culture."

This may be taken as a type of textbook pronouncement.

On the other hand, Maitra and his co-workers are much less dogmatic, and the former, (*Indian Medical Gazette,* March 1925) described a cholera-like disease of low infectivity and moderate severity, in which vibrios were absent in smear and culture.

In the *Indian Medical Gazette,* July 1925, Maitra very plainly voices his doubts as to the columnar sharp-staining epithelial cells. The organism figured and described does not at all resemble the one to be hereafter mentioned, but I have been able on a couple of occasions to recognise epithelial elements, a little less necrosed than usual. This I attribute to a shorter action of the toxin owing to early treatment.

In the *Indian Medical Gazette,* July 1925, Maitra very plainly voices his doubts as to the characteristic textbook appearances. I quote from his paper. "Our experience, however, is not in accord with that of the reviewer or of the textbook writers. During our investigation we often came across cases in the acute stage where no vibrios were visible, but nevertheless they were cultivated successfully on special media."

Whilst in his March paper Maitra approached closely to the conception of two varieties of cholera—a non-spreading less virulent type, not due to vibrionic infection, and a more virulent spreading type due to comma bacilli—he gradually receded from this position, and in his third paper (*Indian Medical Gazette,* December 1925) came to the conclusion that all clinical cases of cholera were associated with vibrionic infection. His adherence to the orthodox view is also shown in the summary of work published in the report of the Calcutta School for 1925, though the case for vibrios is distinctly weakened by the statement that blood agglutinations to Koch's vibrio varied from 1 : 10 to 1 : 200. This is a very different figure from the 1 : 1000 of Manson and Muir and Ritchie, and not nearly so impressive.

In this connection I should like to record my opinion that the isolation of an organism by intensive cultural methods, when little other evidence of its presence exists is rather weak evidence of its causal relationship. The intestinal flora is a rich and varied one.

The writer first became interested in this subject whilst in Mesopotamia, and can

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remember distinctly several occasions in which prolonged search failed to find anything resembling the comma bacillus, though numerous spirochætes—*S. eurgyrata*—were a pretty frequent finding. This might be attributed to lack of skill and technique, and I was at first inclined to consider my failure as due to this cause. Subsequent experience has shown me that the textbook teachings are in some respects inaccurate.

It was during the cholera season of 1925 that the writer first began to closely study films made from the stools of cholera cases, with the idea of so familiarising himself with the appearances presented that the diagnosis of cholera could be made otherwise than clinically. Every year sporadic cases and small outbreaks of clinical cholera occur in the tea gardens of which the writer has charge; and occasionally larger outbreaks are seen, as happened in the first hot weather of the writer's residence, when unfortunately there was neither time nor facilities for microscopic examination. It was quickly found that a good deal of persuasion was necessary to overcome inertia and obtain specimens. This was gradually remedied, and last year I was more successful in obtaining smears than in any previous year.

In another respect I was not so successful. Desiring to obtain smears from cases of severe diarrhœa, so that results might be collated, and the presence or otherwise of any definite organism be excluded, I found myself against a blank wall. It was explained to me that the coolies feared that if their stools were microscopically examined the cholera "poka" might be found, and that they would then be isoloted for three weeks.

After this preliminary explanation I shall proceed to a description of the appearances obtained.

I may first state that I am in complete agreement with Maitra and his co-workers with regard to the presence of degenerated cellular elements, with hazily staining nuclei remaining in cholera stool smears, and like him consider that their appearance is so characteristic that a diagnosis of cholera may be based on their presence or otherwise.

I also agree with him as to the difficulty of finding comma bacilli. It is pretty common to find slender, bow-like, curved rods, about the size of a tubercle bacillus, but I have only very occasionally found anything resembling a comma bacillus, and then only after a good deal of searching.

But in the greater number of the cases which I have had an opportunity of examining, some sixty in all, another organism seemed to be so frequently—and in many cases so predominantly—present that the microscopic picture presented was very different indeed from the classical description.

I had for some time speculated as to whether there might not be two varieties of clinical cholera; one caused by the classical type of vibrio, and another of different causation. This view was originally based upon epidemiological factors, and seemed to receive a certain amount of confirmation when in some cases towards the end of the cholera season of 1925, I first recognised what seemed to me to be a characteristic organism of a type hitherto undescribed. I was aware of Maitra's paper in the *Indian Medical Gazette* of March 1925, in which he mentioned a small outbreak of clinical cholera in which he found short rod-shaped bacilli in clumps amongst a columnar celled epithelial exudate. The description and the micro-photograph given do not however bear any resemblance to the organism noticed by me.

The reason why one was inclined to consider that there might be a second disease clinically resembling cholera was the fact, to which perhaps I may have assigned undue importance for a time, that some of these sporadic cases, though of severe type and showing a high mortality unless treatment was begun early, did not seem as inclined to spread as one might imagine *a priori* would be the case. Though not entirely prepared to discard this view and deny altogether the existence of two diseases, or a para-cholera, I have inclined for some time past to the view that the infectivity of cholera may have been exaggerated. In this district, as far as I can gather from conversation with old residents, cholera tends to appear more regularly every year than formerly, when it was said only to visit gardens at longer intervals, and when it did so produced more severe epidemics. It has never been absent during a whole year from some of the gardens of which I have charge for the past 3 years, and appeared again in 1926. Bengal is recognised as the endemic home of cholera. As the population of this district, and the transport facilities between it and Bengal increase it may be possible that we are witnessing a gradual extension of the endemic area, and that the spread of the disease from the surrounding villages to the tea garden population is being more interrupted than hitherto by such measures as disinfection of wells, prophylactic acid to contacts, and the dawn of some idea of epidemiology in the mind of the tea garden coolie. Should there be anything in this idea, the epidemiological argument in favour of there being two kinds of cholera, the spreading and non-spreading types, loses some of its weight. It may be only a case of infectivity.

In a paper read at the Annual Meeting of the Assam Branch of the *British Medical Association* in March 1925, I touched on some

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aspects of cholera epidemiology and tentatively advanced the hypothesis that sporadic cases were due to a minor water infection, and more severe spreading epidemics to a more massive infection. Something of the same kind is already supposed to exist in the case of spirochætal jaundice, in which the spirochætes at some seasons are conjectured to increase so much in numbers as to be capable of infection.

I may remark here that according to the papers, such as the *Statesman*, Calcutta shows weekly some 20 deaths attributed to cholera during the warm months. If the vibrio must produce spreading epidemics, what are these cases? Are some possibly non-vibrionic? The truth probably is that, whatever the cause of cholera may ultimately prove to be, the diffuse spreading epidemic can only occur as the result of heavy mass infection in a population entirely indifferent to the crudest ideas of sanitation, and where perhaps the initial virulence of the organism has become greatly exalted by frequent passages. My experience inclines me to believe that the infectivity of cholera may have been somewhat exaggerated.

For a considerable time past I have noted the close connection that seemed to exist between such festivals as marriages, etc. and cholera, but attributed it to the increased susceptibility induced by indigestion following excessive eating and drinking. As I mentioned in a previous paper, read at the Annual Meeting of the Assam Branch of the British Medical Association in 1926, cholera seemed to me an ordinary attack of indigestion plus the cholera organism.

My idea then, and for a time, was that Gargantuan feasts of ill-cooked flesh, washed down by copious libations, in people who were generally rice and vegetable feeders fully accounted for the increased susceptibility. It was only during the cholera season of 1926 that it dawned upon me that another explanation might be possible, and that a more intimate connection might exist In several cases small group outbreaks took place, confined to the guests at a marriage or funeral feast, and in these cases a pig had been killed and eaten. The cleaning and cooking seemed to be of the crudest description. As far as I could make out after inquiries made, the animal is first laid on a fire to singe the hairs. It is then opened and the intestines removed. These are cleaned by stripping through the fingers, and a perfunctory rinse in water, and are often only half cooked when eaten.

If this incidence of clinical cholera after such feasts of swine flesh is not a mere coincidence, it may prove that that well known foul feeder the pig is a reservoir of infection, and our admiration for the sanitary wisdom of the Mosaic law may receive an added fillip.

But even if a close connection between the organism of perhaps one kind of cholera and the pig should be proved to exist, this would only account for localised outbreaks. For epidemics it would seem necessary to assume infection of the water supply.

It would be interesting to obtain the relative number of Hindus and Moslems affected by cholera in a district where the populations are approximately equal.

I wish particularly to emphasise that these were not trivial cases of gastro-enteritis, but were clinical cholera, with collapse, rice-water stools, and grave symptoms generally. One such group of six cases occurred amongst the guests at a wedding which unfortunately took place within a stone's throw of my own bungalow, all of which were seen by me. All were typical cases with collapse, suppression of urine, cramps, etc. One died, and two others very nearly did so. All passed characteristic stools, followed in some by mucus. The writer has had a long and wide tropical experience, and has not neglected his opportunities, and there is no doubt in his mind that these were cases of clinical cholera. The same applies to all the cases which were seen by him personally in 1926.

Towards the end of the cholera season of 1925 the writer in examining films made from the stools of clinical cases first began to notice in them numerous small oval cocco-bacilli. One film especially which showed at the same time numerous faintly stained spirochætes such as I had previously noticed in Mesopotamia, showed these in what seemed at first glance almost pure culture, owing to the faint staining of the spirochætes. So impressed was I by some of these specimens that a few were kept over to compare with those of the following year. I endeavoured also to make arrangements for the securing of two or three films from every case of clinical cholera occurring in my practice. Owing to the fact that the treatment adopted is by cresol and acid, I was at pains to stress the importance of obtaining films as early in the case as possible. This was done for two reasons; firstly because the causal organism was more likely to be present in large numbers before the bowel had been swept almost clear of contents, and secondarily because the acid used in treatment might lead to defective staining of some organisms which might be present. I also endeavoured to obtain films prepared from stools as soon after passage as possible to lessen the likelihood of organisms not originally present in the bowel increasing greatly in numbers after passage. A certain number of films were made by myself as opportunity offered. In every case instructions were

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given that the film should be made from the shreds or so-called rice-grains of the stool. This however was not always very perfectly carried out.

Altogether over two hundred films from some sixty cases were examined in 1926. The first film examined showed a cocco-bacillus similar to that noted in the later 1925 cases, and nearly all the films since examined have given a similar finding, for unless the organism occurs in large numbers or characteristic grouping it may be difficult to distinguish solitary examples of the oval form from other rapidly dividing bacilli.

The organism is a small oval or boat shaped cocco-bacillus, sometimes occurring in enormous numbers in films and giving a "fish in the stream" appearance. At other times it occurs in frequent clumps or clusters. When the "fish in the stream" appearance is presented the organism generally stains homogenously, but at other times, and often in the clumps, an appearance of bipolar staining is presented which later seems in some films to suggest spore formation. There seems to be a certain amount of variation in size, shape, and dye-affinity at times: and when some portions of a film show well stained clumps, other portions may show somewhat similar clumps of faintly staining "ghosts," which seem larger and less distinct, and may be involution forms, or perhaps due to the acid used in treatment. The organism can be seen in enormous numbers in what appear to be portions of the desquamated bowel wall with faintly staining and necrosed nuclei.

The organism stains readily as a rule with methylene blue, gentian or methyl violet and carbol fuchsin.

The appearances presented suggest that some degree of pleomorphism exist.

In a few specimens I have seen bacilli with bipolar staining exactly resembling *B. pestis,* but not staining very sharply, and more deeply stained clear cut bacilli of the same size with a central spore in the same field, and it seemed difficult to resist the suggestion that they were the same organism.

Cultures at room temperature have been made from three cases only, each of which belonged to a different outbreak and garden. From the first, on ordinary agar a small central spore-bearing bacillus was isolated in white circular colonies, and appeared identical with that seen in the stools.

In the two later cultures I endeavoured to imitate the alkaline cholera stool, and made the agar quite definitely alkaline to litmus paper. In these no growth was visible for a couple of days, when the whole surface suddenly became covered with a barely perceptible film which gradually became more manifest, through which later other colonies appeared. This film appeared to be made up chiefly of a large and small central spore-bearer. The large spore-bearer was subsequently isolated from a control made from a rice eater's fæces. There are two varieties of small central spore-bearer, both of which I have seen in cholera films. The most common and the smaller shows a small oval central spore. The other, a little longer, shows a more elongated spore. Though both these forms have been seen in cholera films, the former is generally much more evident and is the one which may prove of pathogenic significance.

So far the small central spore-bearer has been cultured from three cases of cholera only, but not from the fæces of a rice eater and a European. The elongated spore-bearer has been cultured from a rice eater's fæces.

The small central spore-bearer forms a growth like white enamel in older cultures. The others are not so shiny in appearance.

In alkaline broth a pellicle growth appears on the surface after many days. A slender bacillus with three or four spores has also been isolated and organisms similar in appearance have often been seen in films, but I do regard them as of pathogenic significance.

Though in the stool films one appears to trace transitions between the oval coccus and the bi-polar staining bacillus, and between that again and the small central spore-bearer, all the culture forms of the small spore-bearer are alike in showing a spore from the earliest moment of growth. Possessing no incubator, I am unable to say whether these forms may not appear under more favourable conditions. At present their lack forms a missing link in my chain of evidence.

This portion of the work is far from complete, as I am only too well aware, but my facilities for bacteriological work are of the most meagre description.

CONCLUSIONS.

(1) From an intensive study of films from over sixty cases of clinical cholera there is no evidence that the comma bacillus plays any part in its causation in Cachar.

(2) This may be due to there being two varieties of clinical cholera, but should this be the explanation (and I rather incline to another view), Cachar and Bengal are so close geographically, and so alike climatically, that a disease of similar ætiology will almost certainly account for a large number of cases of clinical cholera in Bengal.

(3) On the evidence of films, clinical cholera in Cachar would appear to be associated with a small cocco-bacillus which often assumes a bi-polar staining form. Whether this is identical with the small spore-bearing bacillus is not yet certain.

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(4) The other organisms present—spirochætes, etc.—are not constant, and probably represent secondary growths in rice water fluid of organisms which find conditions suitable for their rapid growth.

(5) Clinical cholera in Cachar has been found associated with infection presumably due to pig's fæces.

(*Note.*—We publish Colonel Palmer's article, chiefly because of its epidemiological interest, though we dissociate ourselves entirely from his view of the bacteriology of cholera. Cholera-like conditions may be due to many causes—to malignant tertian malaria, to name but one.—EDITOR, *I.M.G.*).

A Mirror of Hospital Practice.

A CASE OF DERMATOLYSIS.

By M. UMAR,
Bijnor, United Provinces.

THE patient, Allah Dai, Mahommedan female, aged 22 years, married, was admitted to this hospital for treatment of the condition shown in the accompanying photographs.

History.—Her mother states that when Allah Dai was born, the child's left leg was bigger than the right. She was married at the age of 18, and became pregnant 2 years later. In the 7th month of her pregnancy,

Fig. 1.

pain began in her left leg. This increased daily and the leg commenced to enlarge. She gave birth to a stillborn child. From that date the pain and swelling have increased more rapidly.

Condition on admission.—The whole of the muscles and subcutaneous tissues concerned in the thighs and gluteal areas are so loose that they hang in folds about the body. The labium majorum on the left side is enlarged to

Fig. 2.

such an extent as to push the vaginal orifice to the right side, and the latter can only be recognised as a cleft by the presence of hair. For the past 5 months the patient has not menstruated. There is no history of syphilis.

The patient refused to stay in hospital.

Discussion.—In my opinion there is no treatment possible for this condition. It is one of the malformations which increase after puberty is attained. If any reader of the *Gazette* can suggest a correct diagnosis and the best line of treatment for the condition, I shall be grateful.

(*Note.*—We have shown the above notes and photographs to Lieut.-Col. H. W. Acton, I.M.S., who is in charge of the skin out-patient department of the Calcutta School of Tropical Medicine. Colonel Acton remarks that the condition present is clearly one of dermatolysis. This is a rare condition, usually familial or of hereditary tendency, and the condition is slowly progressive once it appears, and especially so after puberty. It is apt to be mistaken for elephantiasis in this country. In 1926 two similar and very interesting cases were seen at the Calcutta School of Tropical Medicine, which affected mother and son, the latter especially with regard to the scalp. The condition is often associated with multiple small fibromata—von Recklinghausen's disease; and the second of the two photographs above appears to show such small fibromata present on the front of the right thigh of the patient.

There is no treatment for the condition, except excision, which is often impracticable.—EDITOR, *I.M.G.*).

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APRIL.

PREVENTABLE YET NOT PREVENTED.

It is easy to point with pride to the triumphs of medical science. In England and other European countries the average duration of life has been greatly increased within the past fifty years. Many diseases have been banished from Western Europe, for example plague, cholera, leprosy, typhus fever and relapsing fever. Small-pox would have vanished long ago but for the apparent desire of certain people to retain the disease in our midst.

Altogether the improvement in our conditions of life have been such that nobody would care for a return of the "good old days." But there is another side to the picture, we have some conspicuous failures to record. Diphtheria is as common as ever, though it is not so fatal owing to the use of antitoxin; rheumatic disease of the heart shows no sign of disappearing; cancer and insanity are definitely on the increase.

It is advisable to look closely into these diseases which have not been controlled by modern medicine and to enquire whether there is no possibility of causing a diminution in their ravages.

Insanity and mental defects are often due to inherited defects, and there is little prospect of controlling them unless we are prepared to prevent the propagation of the unfit. Public opinion is not prepared for legislation for the sterilisation of the mentally defective, so that the only means of dealing with this problem is by propaganda for the instruction of the public in the danger of transmitting inheritable disease.

Rheumatic fever offers better hope of successful action. The experts advise us to adopt early diagnosis and treatment as the most promising methods of control, but prevention is hardly mentioned as a possibility.

There is a good deal of evidence that the rheumatic infection enters the body by the tonsils and upper air passages: if this be so the disease must be classed with the droplet infections and dealt with accordingly.

It is remarkable that those very persons who insist that the infection enters by the respiratory passages are also those who advocate early diagnosis as the best method of alleviating the damage which is done by rheumatic disease of the heart. Medical men seem to suffer from a peculiar form of inhibition in the case of droplet infection, they repeat the formula that respiratory infections are conveyed by droplets of sputum and we expect them to carry their belief to its logical conclusion, but to our surprise they shy off as if it were impious to interfere with the efforts of nature to perpetuate the bacteria which make their homes in our air passages. It would appear that there is a lack of faith in the doctrine of droplet infection in connection with rheumatic heart disease and we do not care to interfere with the habits of the community unless we have a definite assurance that our efforts will be successful.

But suppose that we were to start a compaign against the spread of droplet infection, holding out as a bait the hope that heart disease might be controlled. Suppose then that we were to succeed in reducing air-borne infection to the same extent as we have reduced water-borne infection. We might conceivably fail to control rheumatic heart disease but we should almost certainly have banished many other diseases which are conveyed by sputum spray, and it is likely that the public would take a lenient view of our failure to abolish heart disease, seeing that we had caused a great reduction in influenza, pneumonia, diphtheria, tonsillitis, bronchitis and tuberculosis.

We are filled with horror and disgust when we think of swallowing food and water which are contaminated with fæcal matter, but we have not the slightest objection to inhaling air which has been fouled with particles of sputum. It is decidedly unfair that water-borne bacteria should be pursued so ruthlessly while their air-borne brothers enjoy immunity from pursuit. Evidence has been brought forward that the air passages of the new born babe are exceptionally devoid of defence against respiratory infection, so that air-borne bacteria which lodge during the first few weeks of life are capable of installing themselves permanently. Whether this view is completely true or only partly true, it is obvious that we ought to take special precautions to keep infants free from the dangers of respiratory infection which they are compelled to run owing to the ignorance of their parents and attendants. The control of respiratory infections would be much easier in childhood than in adult life, and if we could cause a great reduction in the numbers of the carriers of bacteria of the air passages in childhood the problem of dealing with adults would be greatly simplified.

We have not learned the lesson of the pandemics and epidemics of influenza. Undoubtedly these were spread by droplet infection, yet we view with fatalistic inaction the march of influenza through families, offices and schools. We tolerate the people who cough and sneeze in churches, threatres and rooms; the mere idea of restraining them from spreading infection is repugnant to our sense of propriety. People have always been allowed to

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cough and sneeze whenever and wherever they feel inclined to do so; this is one of the cherished rights of the citizen. The best that we can hope for is to carry out active propaganda in the hope that the next generation will grow up with less respect for the filthy customs of their ancestors and it may then become practicable to institute a campaign for uncontaminated air.

The pictures of Hogarth show that the citizens of London were in the habit of throwing filth of all kinds into the streets; we have progressed far since the 18th century, but we have still some way to go.

Cancer is definitely on the increase. In the case of this disease there is no need to arouse the community to a sense of their danger, everybody knows that those who have reached the age of thirty in England have a one in seven chance of dying of cancer. In India the risk is somewhat smaller, chiefly because the other causes of death are so energetic that cancer has to take a lower place in the list of the causes of death.

Sir Berkeley Moynihan recently addressed a large and poignantly interested audience in London on the subject of cancer. He pointed out that many of the theories of the causation of that disease had little or no evidence to support them. Heredity, diet, infection, contagion, locality cannot be demonstrated to play important parts. On the other hand he rightly emphasised the fact that chronic irritation is often a precursor of cancer, he gave as examples cancer of the tongue, mule spinner's cancer and the *kangri* cancer of Kashmir. Many other examples could have been cited, as we have already pointed out more than once in these pages.

Sir Berkeley's advice to the public was on the same lines as that given by the recent International Cancer Conference, he advocated propaganda for the instruction of the public in the early manifestations of the disease so that it may be diagnosed at a time when surgical treatment can be carried out with hope of success. This advice is good, but it offers cold comfort to the millions who live in dread of the disease, and it fails to help those who suffer from deep-seated cancer. It is somewhat surprising that neither Sir Berkeley nor the International Cancer Conference have followed up the one definite clue which we possess to the causation of the disease. There are at least a dozen forms of cancer which are known to follow chronic irritation. In the case of these we can definitely assert that the disease can be avoided by eliminating these forms of irritation. It does not matter in the least that there may be other factors concerned, the important thing is that there is one known factor which is essential to the causation of cancer in certain cases, for example the *kangri* cancer, mule spinner's cancer, radiographer's cancer, and betel chewer's cancer. If chronic irritation is proved guilty in some forms of the disease, it is also under strong suspicion in the case of others. It is significant that cancer of the penis is common among Hindus and rare among Mahomedans. The obvious difference between these two sects is that the one adopts circumcision and so avoids the possibility of retention of irritating smegma between the foreskin and the glans penis, while the other lays itself open to this danger. It is therefore clear that circumcision or even cleanliness of the penis will prevent many cases of cancer. There is plenty of evidence that cancer of the œsophagus and stomach is much more common in Europe than in India. We cannot find an explanation in racial differences of susceptibility as we know that some other forms of cancer are more common in India than in Europe. As chronic irritation has been convicted of responsibility for certain kinds of cancer, we naturally ask whether it may not be concerned in this difference in incidence of cancer of the stomach and at once we find a possible explanation of the frequency of the disease in Europeans when we consider the extent to which the drinking of scalding hot liquids prevails in the colder countries. Prolonged irritation by heat has been proved to be the cause of *kangri* cancer and it is reasonable to expect that the delicate mucosa of the œsophagus and stomach will suffer readily by frequent applications of hot liquids. This clue is well worth following up, especially as there is no possible danger in advising people to give up a habit which can do no possible good but may be exceedingly dangerous. It would seem to be worth while to lay stress on such a possibility as this, even if we have no absolute proof that we can abolish cancer of the stomach by so simple a means.

The cervix of the uterus is obviously much exposed to chronic irritation, but this is a subject on which the gynæcologist is best qualified to express an opinion. The rectum is another organ which is exposed to irritation associated with constipation. The breast is one of the favourite seats of cancer, and though it is perhaps more difficult to suggest a clear association between chronic irritation and cancer of the breast than in the case of the other organs, there are many examples on record in which there is a strong suggestion that irritation is an important factor. The position then is that we can dogmatically assert that some forms of cancer can be prevented with certainty, there are others in which we have valuable clues to prevention, and there are comparatively few in which we cannot find any evidence of a helpful nature.

There is no need to spoil our case by making dogmatic assertions which are not supported by known facts, but there is no reason

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why we should not state clearly the facts which are in our possession and the inferences which may reasonably be drawn from them. So long as we make it clear that we are dealing with very suggestive clues—not with proved certainties—there is no danger of unpleasant recriminations afterwards. Further research should be carried out with renewed energy, but some of the research workers should be set to work to follow up the definite clue which we possess in connection with chronic irritation.

The knowledge which we already possess is of so suggestive a nature that we are amply justified in advocating an avoidance of the forms of irritation to which certain organs of our bodies are subjected. At present our action resembles that of the leper in the Scriptures who refused to wash in the waters of Jordan because he had no evidence that these had any properties different from those of the rivers of his own country. We also are inclined to regard the discovery of the cause of a disease as an end in itself, rather than as a means whereby prevention and treatment can be improved. If we were to prevent certain forms of cancer merely by following up a suggestive clue, the delay in finding out the ultimate secrets of cancer causation would be less of a tragedy. In everyday life the business man takes action on more slender information than we possess in the case of cancer. The verdict of future generations may well be that we have failed, not so much in acquiring knowledge, as in refusing to act on the knowledge which we have already accumulated.

We make no apology for returning to a subject which has already been dealt with more than once in this journal, its importance is a sufficient justification for the action. No claim is made for originality in the views which have been expressed as to the part played either by droplet infection or chronic irritation, but we do claim that rational lines of action for the control of these uncontrolled diseases have never been clearly advocated or emphasised.

Just after writing these lines an interesting book review has reached us. This appears in the *British Medical Journal* of February 5th, 1927: it refers to a volume by Dr. Menetier of Paris on cancer. Twenty years ago Dr. Menetier held that cancer is secondary to multiple and non-specific irritative processes. He still adheres to the same view in spite of all the special research which has been carried out. The volume has not yet reached India, but the reviewer does not mention that Dr. Menetier advocates the avoidance of these known forms of prolonged irritation.

If cancer is caused by prolonged irritation of organs, why allow the irritation to continue?

SPECIAL ARTICLE.

COMMENTS ON THE PRESENT POSITION OF THE TREATMENT OF LEPROSY.

By E. MUIR, M.D., F.R.C.S. (Edin.),

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(The following is an article sent by Dr. Muir to Sir Leonard Rogers, who read it before the Tropical Diseases' Section of the Royal Society of Medicine on the 3rd February 1927. It is therefore likely that the paper will appear in the *Proceedings of the Royal Society of Tropical Medicine*. The subject is, however, of such importance in India that we have taken the liberty of publishing Dr. Muir's article; with due acknowledgments to our contemporary should the article appear in the *Proceedings of the Royal Society of Medicine*, 1927.—EDITOR, *I.M.G.*).

Introductory.

IT is necessary to emphasise that there is no specific for leprosy, i.e., there is no specific in the sense in which antimony is a specific for kala-azar or quinine for æstivo-autumnal malaria. It may also be clearly stated however that there is a line of treatment which will cause the permanent disappearance of all active signs of the disease in early cases so that the patient is for all practical purposes *cured*, though, if a marked reduction in his general health occurs later, there is always the possibility of a relapse.

It may be confidently asserted that if leprosy and tuberculosis be compared stage by stage, the former is the more remediable of the two diseases. Leprosy in almost all cases can be diagnosed with ease from clinical signs long before bacilli can be found in the lesions. Pulmonary tuberculosis can also be diagnosed in its earliest stage before bacilli can be found; but, speaking generally, the prognosis in such an early case of leprosy is more favourable than that in the corresponding case of tuberculosis.

Form of Treatment Recommended.

The following is the line of treatment used at present in Calcutta, the items being mentioned in the order of procedure:—

1. The treatment, when present, of accompanying diseases, both physical and mental.
2. The rectification of the diet.
3. Gradually increasing exercises.
4. The use of special drugs, the injection of hydnocarpus oil, and its preparations being the most important.
5. External applications and surgical interference when necessary.

It is beyond the scope of this paper to go into the full details of this treatment, but illustrations of the importance of its various items may be mentioned.

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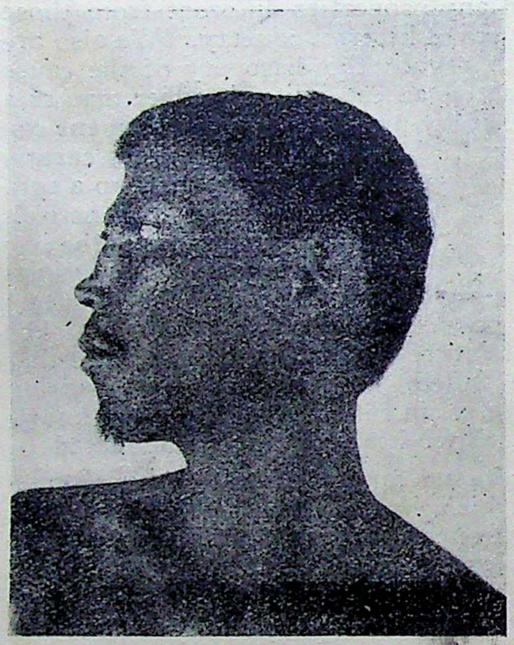
Syphilis is one of the most important of the diseases accompanying leprosy as we find it in India. We have frequently seen treatment carried on for lengthy periods in cases of leprosy in which the presence of syphilis had not been diagnosed, the patient only growing worse. In such cases the recognition and treatment of syphilis has been accompanied by immediate improvement, the leprosy sometimes clearing up without any special treatment beyond that of ordinary anti-syphilitic measures. Malaria, dysentery, and other diseases, which lower the resistance also frequently lay the patient open to leprosy or prevent his recovery.

As in tuberculosis, attention to diet is exceedingly important. A recent enquiry into the reasons for the very much higher endemicity of leprosy in some parts of India as compared with others has brought out the fact that the diet of the people is the most important factor. The better results obtained in the out-patient treatment of leprosy as compared with the treatment in asylums is largely due to this. In one of these institutions, where treatment is being carried on with indifferent results, the patients are given a supply of rice along with one and a half annas a day for their food. Those who buy good food with the money are in a constant state of semi-starvation, while others who buy cheaper food, such as the favourite badly preserved fish of that district, remain in a state of food intoxication. What wonder if the treatment is ineffective?

Gradually increasing exercises are no less important in leprosy than in tuberculosis, but the graduation does not need to be as slow or as carefully regulated as in the latter disease. This is another reason why out-patient is better than in-patient treatment, as in many of the asylums in India there is but little opportunity for exercise. This defect, however, is being rectified to a large extent in the best institutions, and in many of them patients have the chance of adding to their food supply by the labour of their own hands. Improvement is generally rapid in those who through well regulated exercises, games, etc., bring their bodies under training. Leprosy seldom makes the patients feel ill or confines them to bed, except those who have reached the deformities of the last stage; and thus from the nature of the disease such physical development is possible. On the other hand, the rapid progress of leprosy from bad to worse when it occurs, is often largely due to the despair and physical and mental inertia which are induced by fear and horror in the patient who knows that he is suffering from this much dreaded disease.

Case 35.
Before Treatment.



Case 35.
After Treatment.

With regard to the special drugs used, we have found, after much testing of various vaccines and other remedies which have been recommended, that chaulmoogra and hydnocarpus oils and their derivatives stand in the first place.

It is not easy to test drugs in a reliable way in leprosy. From the very nature of the disease mistakes are apt to be made. One of the commonest of these errors is caused by

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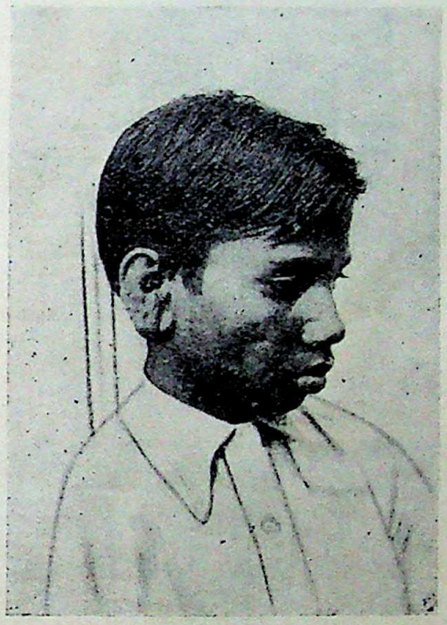
the reactions which often occur. The disease may follow a quiet course, the bacilli multiply in the skin, lymphatics and nerves, until suddenly, due to one of a hundred possible causes, the phase of reaction intervenes. Lesions which had not been noticed before, or had been ignored as of no importance, become suddenly red and swollen and the patient seeks the advice of the doctor, who experiments with some drug or other and finds to his delight that in a short time the lesions subside. He does not realise that the erythema and swelling of the lesions indicate only a phase in a process which had been going on unnoticed for years, and that in the natural course of the disease they would have subsided of their own accord; and he accordingly gives the credit for the apparent improvement to whatever remedy he may have happened to use. Most of these remedies, which are heard of from time to time, have been tested on only a few cases or even on only one case. Certain drugs do, however, possess a marked power in reducing leprous reactions when these do not pass off of themselves within a short time; and such remedies are of special value as prolonged reactions weaken the patient considerably and may cause the formation of new lesions and a rapid extension of existing ones, especially in the earlier stages of bacteriologically positive cases. Among such reaction-reducing drugs we have found antimony the most useful, and have frequently proved that a few intravenous injections of small doses (0.02 to 0.04 grammes) of potassium antimony tartrate rapidly bring about a cessation of active signs which had persisted for several weeks.

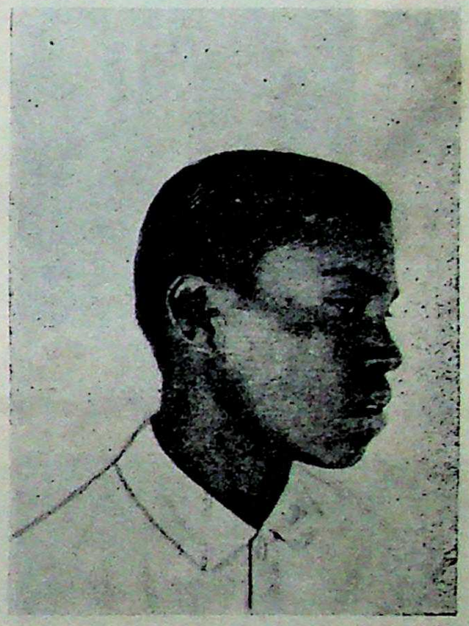
The treatment of the actual disease in its prolonged course must, however, be distinguished from the treatment of such reactions which come and go, and for this purpose we have found that, though vaccines are useful—especially in certain cases, hydnocarpus oil and its derivatives are the most reliable standard treatment.

Our present routine is to begin with injections of hydnocarpus oil containing 4 per cent. creosote given either intramuscularly or by infiltration under the skin of the extensor surfaces of the body. Injections are given twice a week, beginning with 4 c.c. and gradually rising to 10 c.c. When patients are able to stand the latter dose without local or focal reactions, a solution of sodium hydnocarpate in saline 1 per cent. is given intravenously twice weekly, beginning with 2 to 4 c.c. and rising to 10 c.c. These are continued until either a reaction is produced or the veins become blocked, when oil infiltration is substituted once more. The veins become blocked by sodium hydnocarpate in some cases but not in others. We have not yet been able to discover what causes the difference between patients in this respect. Probably an alternation of these two methods is the best way to administer hydnocarpus treatment. The oil given subcutaneously or intramuscularly is more slowly absorbed and less likely to cause reactions. The sodium salt in watery solution, being more quickly absorbed, has a greater tendency to cause reactions.

It may be asked whether we should aim at causing reactions in carrying out the treatment and what are the advantages and dangers connected therewith.



Case 59.
Before Treatment.



Case 59.
After Treatment.

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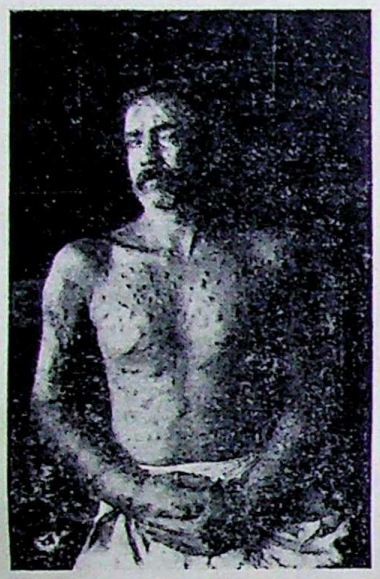
In the earliest cases, which can only be diagnosed clinically, seeing that bacteriological examination is negative, there is not sufficient lepromatous tissue in the body to break down and cause a reaction. Later on, when there is a greater number of lepra cells and yet not a high degree of immunity, a reaction, accompanied as it is by the setting free of bacilli in the blood stream, often results in the metastatic formation of new lesions. Still later, however, a third stage is reached in which a reaction is followed by beneficial results. The lepromatous tissue breaks down, and bacilli are carried to different parts of the body; but at this stage sufficient immunity has been acquired to cause their destruction; and, though small nodules appear in the skin at various points indicating the blocking of capillaries with bacillary emboli, they soon disappear again and leave no trace. In the fourth stage, in which bacilli have again become reduced in number and those that remain are more confined to the nerve trunks, the stage in which anæsthetic lesions and deformities appear, reactions may occur in the nerves and cause considerable pain.

It is in the second stage, however, that particular care has to be taken to avoid untoward results. Only very small doses of hydnocarpus oil or its preparations should be given until the general resistance of the patient has been improved by carrying out treatment



Case 133.
Before Treatment.

Case 133.
After Treatment.

Case 133.
Before Treatment.

Case 133.
After Treatment.

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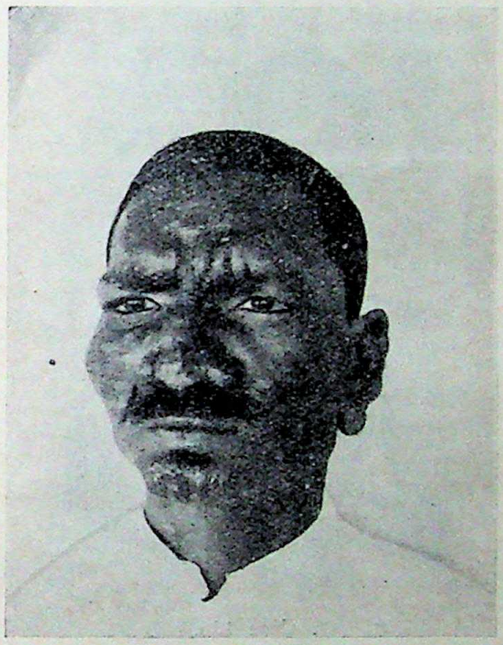
along the lines first mentioned, and especially until his muscles have become hardened by exercise: thereafter comparatively large doses may be administered without fear of reaction. In the third stage treatment may be pressed without fear of extension or exacerbation of lesions. Moreover in this stage benefit may be caused by innumerable forms of treatment. In such a patient there is sufficient immunity to cause destruction of all the bacilli in the body; but the organisms, being protected by their position in the lepra cells, remain undestroyed. Anything, therefore, which leads to the breaking down of these cells causes improvement.

Among the agents which break down lepra cells may be mentioned the following:—(a) acute fevers such as malaria, kala-azar, streptococcal and staphylococcal infections; (b) anything which causes protein shock; and (c) the injection of irritating substances such as many of the drugs which have been used in leprosy with beneficial results. In one most striking case acute *exfoliative dermatitis* was caused by administering stovarsal. The patient almost lost his life, but on his recovery the bacillary infection, which had been a very marked one, had almost entirely disappeared, only a few granular remains of bacilli being found upon bacteriological examination. This case was particularly instructive as showing how rapidly lepra bacilli can be cleared out of the skin in certain circumstances.

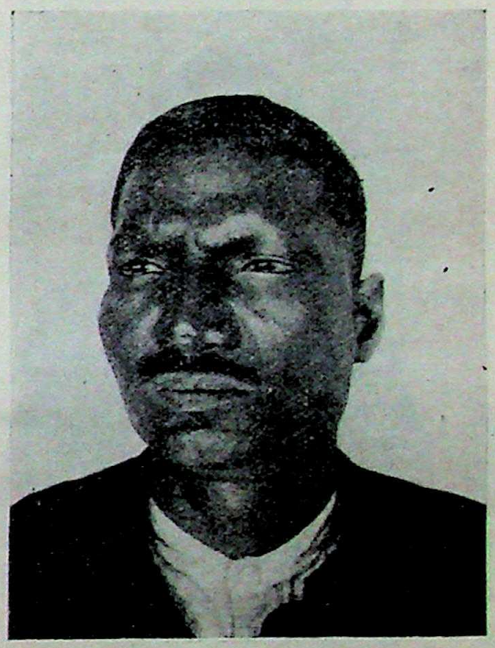
In patients in the third stage vaccines are very useful, especially when given intravenously, but the action is more of the nature of anaphylactic shock than specific.

The real test of the efficacy of any special treatment for leprosy is its effect in the first and second stages; and we find in Calcutta that hydnocarpus oil and its preparations are the most useful special remedies in these stages.

Leprosy as a rule is not a very painful disease except when nerve reactions take place. These may however be very severe and cause great distress. One or more nerve trunks become swollen and so tender that the patient cannot bear the lightest pressure on them or the slighest movement of the parts affected. Sometimes only one nerve is affected: at other times several; when limited to one nerve its swelling and tenderness are relatively more marked. The intramuscular injection of 3 or 4 minims of 1 in 1000 adrenalin chloride diluted with 30 minims of normal saline has often an almost magical effect in causing cessation of pain, especially when several nerves are affected. If the reaction is confined to one or two superficial nerves, infiltration of the connective tissue round and outside their sheaths with 0.5 per cent. sodium bicarbonate solution in distilled water generally gives rapid relief. In a few cases, however, when the swelling is very rapid and severe, these measures only partially allay the pain, and in these cases it is advisable to cut down along the line of the nerve and free the nerve trunk, which may be 1|3rd or even ½ inch in diameter from the surrounding tissues. The nerve most frequently affected is the ulnar, which when much swollen may be constricted between the humerus and the fascia which passes



Case 110.
Before Treatment.



Case 110.
After Treatment.

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from the internal condyle to the olecranon. The severing of this fascia often has a very beneficial effect, and may save the patient from rapid trophic changes in the small muscles of the hand. The freeing of the nerve is followed by instant relief from pain and diminution of anæsthesia in the zone of ulnar distribution: within a few hours of the operation the fingers can be moved much more freely.

It is not within the scope of this paper to go into further details of treatment but I think that enough has been said above to make the following points clear:—

1. That, if treatment is to be effective, it must follow the careful study of each individual case; and that rule-of-thumb remedies are not likely to give good results.

2. That any line of treatment which does not put the restoration and maintenance of the general health and resistance of the patient in the forefront will seldom succeed.

3. That permanent lesions must be clearly differentiated from those caused by bacillary infection present at the time; otherwise confusion and disappointment may arise.

LENGTH OF TREATMENT.

How long should treatment be continued?

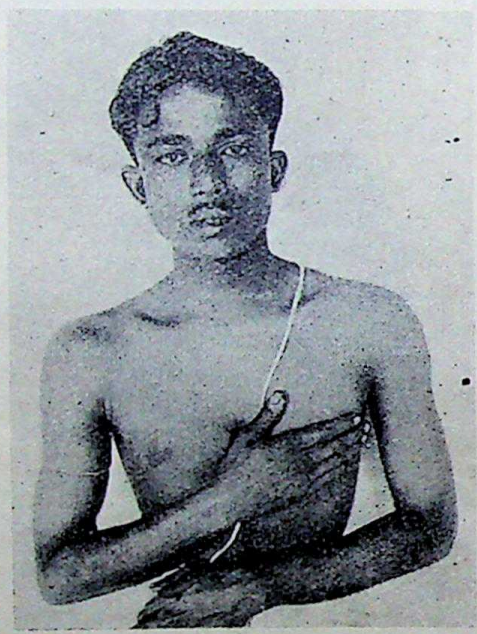
Generally speaking, till all active signs have remained absent for a period varying from 6 months to 2 years. It is certain that the disappearance of active signs does not correspond with entire disappearance of disease. What then is to be the guide as to how long treatment should continue after active signs have vanished? If the progress up to that point has been rapid, it stands to reason that the progress after that point will probably be equally rapid and therefore post-active-sign treatment may be curtailed. If on the other hand progress up to the disappearance of the active signs has been slow, treatment must be continued thereafter for a much longer time.

What should be considered the criterion of the disappearance of all active signs?

(1) Inability of an expert to find upon careful, repeated examinations of the skin by clip smears, of the nasal mucosa by scraping, of the lymph nodes by puncture, or in any other way possible, any traces of Hansen's bacillus over a period of 6 months. (2) The disappearance of all erythema from macules and the absence of all changes in lesions, such as the increase or decrease of anæsthesia, during a period of 6 months.

After this point is reached and special treatment has been stopped, the patient should always appear for inspection at stated intervals for at least 2 years. He must be warned that, although from a clinical point of view he is cured, there is no certainty that the infection has entirely disappeared from the body, and that anything which interferes with his general health may be followed by the reappearance of the disease; although the longer he continues free from active signs the less likely are they to recur.

Case 136.
Before Treatment.



Case 136.
After Treatment.

Causes of disappointment with treatment.

The permanent efficacy of antileprosy treatment has been doubted by many authorities. Failure to obtain good results is largely due to one or more of the following causes:—

1. Because leprosy is not recognised in its earlier stages and only advanced cases are treated, either those in which lepromatous infiltration has become generalised, the larger

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part of the skin and the nasal, buccal and pharyngeal mucous membranes having become involved, or cases in which deformity has already begun to set in.

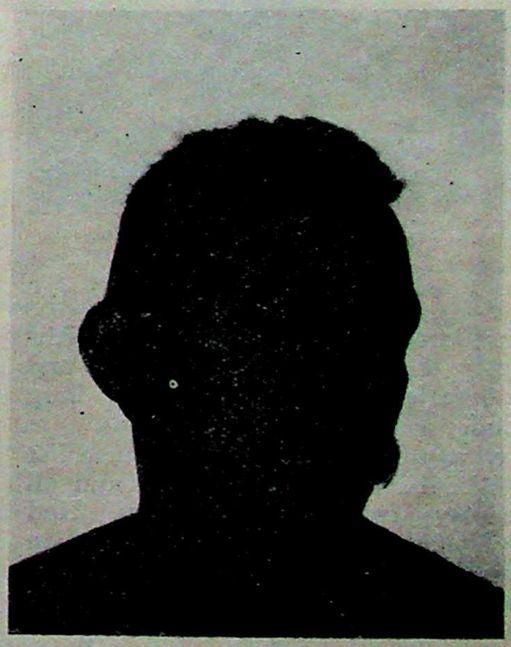
2. Because the treatment has consisted only of some special drug administered either orally or by injection, while there has not been recognition of the paramount importance of treatment of the general condition of the patient and restoration and maintenance of his general health, both during and after treatment. We should not think much of the skill or knowledge of a doctor who treated tuberculosis by a drug alone, and neglected diet, sunlight, open air, rest and graduated exercises, and the other generally approved elements in the treatment of that disease. Still, all these factors are equally important in the therapy of leprosy and success cannot be expected unless due emphasis is laid upon them.

3. Because it has not been realised that there is generally at the back of leprosy some other disease such as syphilis, malaria, etc., which is lowering the resistance of the body and which must be remedied first if improvement is to take place.

Case 153.
Before Treatment.

Case 153.
After Treatment.

Case 446.
Before Treatment.



Case 446.
After Treatment.

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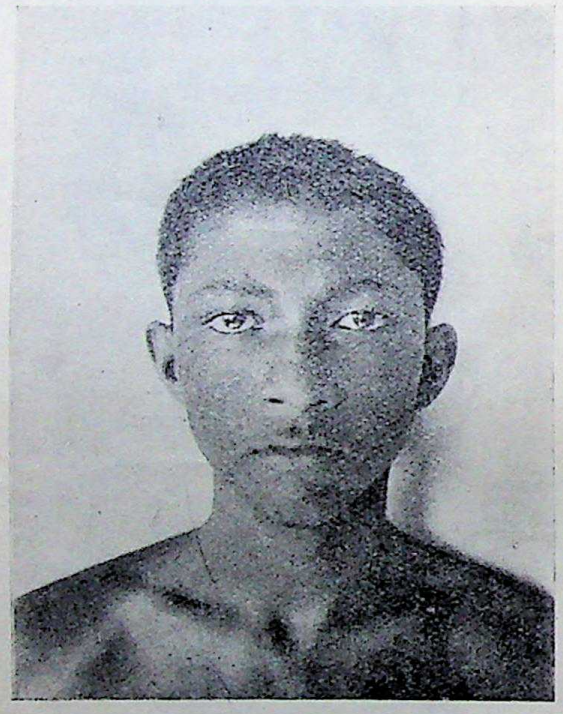
4. Because the difference between permanent and active lesions has not been recognised. I have seen patients, in whom infection had been absent for years, being treated in the hope that sensation would be restored to anæsthetic limbs, and the treatment condemned because there was no improvement. The doctor did not recognise that anæsthesia was due to fibrosis of the nerve trunks and destruction of the axis cylinders of the sensory nerves, and that restoration of these nerves and of sensation was no more possible than the restoration of the fingers which had disappeared.

5. Because claims have been made for cures when all that had occurred was the subsidence of a reaction and the clinical signs that accompanied it.

Finally I should like to repeat that we have as yet no remedy which in the true sense of the word may be called a specific cure, any more than we have such a remedy in tuberculosis; but by carrying out treatment along the lines indicated above we can hope for a permanent disappearance of all active signs in almost all patients in whom the disease is recognised early. In the later stages, although much more prolonged treatment is necessary, very promising results are obtained and many have become entirely well and remained so for periods of several years.

If this last statement is recognised as true, a little consideration will show its extreme importance in dealing with the problem of leprosy in a country like India. Hitherto, the fear of leprosy and the shame attending its

Case 456.
Before Treatment.



Case 456.
After Treatment.

6. Because cures have been declared without sufficiently thorough bacteriological and clinical examinations continued over a long enough period.

The following table is extracted from a list of patients who have remained free from all signs of leprosy from 1 to 5 years. Had we a more efficient intelligence department to follow up such cases the number would probably have been four or five times as large:—

Length of time of freedom from active signs.

	Number.
1 year	15
2 years	13
3 years	18
4 years	17
5 years	1
	64

presence have acted as two of the most potent factors in preventing recovery by depressing the patient and by leading him to hide the disease as long as possible till it had passed the early, easily remedied stages. Now that there is hope of recovery, fear of leprosy drives patients to come for treatment in the earlier stages, and about 80 per cent. of the patients attending the leprosy clinic at the Calcutta School of Tropical Medicine belong to these stages. The treatment of these patients is cutting off to a large extent the bacillary reservoirs which would have served to infect the next generation. We may doubt whether a true specific for the treatment of leprosy will ever be found—I myself doubt it very much—but I think that we have already in our hands a line of treatment which will aid the rapid disappearance of leprosy from India and from the world, though delay is inevitable ow-

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ing to the ignorance and backwardness of certain classes of the community. I believe however that the carrying out of this treatment and the social and hygienic reforms which it implies, backed up by the widespread fear of leprosy which exists, is likely to become an important agent in ameliorating the backward condition of these people.

The following are short notes on some cases of special interest. Photographs shewing the state of patients before and after treatment are attached.

Case No. 35.—S. M., aged about 40 years, third stage; predisposing cause, malarial fever (bed-ridden for 3 months); duration 6 years, Wassermann reaction negative; erythemateous patch first noticed on arm, then after 2 years similar patches appeared on cheeks and other parts.

Case No. 59.—A. L. N., aged about 19 years, third stage; predisposing cause, dyspepsia; duration 10 years; smear from skin clipped from an ear and nasal smear bacteriologically positive. Wassermann reaction negative. Depigmented patch on right forearm to begin with; after 4 years the patch began to spread and similar patches appeared on other parts. Then a year after this, the lobes of his ears and patches became thickened.

Case No. 110.—R. M., aged about 30 years, third stage. Predisposing causes syphilis and malaria; duration 8 years. Smear from skin clip and nose bacteriologically positive. Wassermann reaction strongly positive on 7th November, 1924. About 3 courses of sulfarsenol and 1 course of novarsenobillon with bismuth cream and mercury ointment inunction, Wassermann reaction negative on 9th October, 1925. It became positive again on 2nd February, 1926. After 2 further courses of novarsenobillon and mercury ointment inunction, Wassermann and Khan reactions still positive.

Case No. 135.—A. C. P., aged about 47 years, second stage. Predisposing cause, syphilis; duration 1 year. Smear from skin clip positive; nasal smear negative; after a year's treatment skin became negative bacteriologically. Wassermann reaction strongly positive, but became negative after a course of novarsenobillon with mercury ointment inunction. A small depigmented patch appeared on right arm, then after 8 months raised erythematous patches appeared almost all over the body. Patient showed much improvement during the course of antisyphilitic treatment.

Case No. 136.—S. H. G., aged about 24 years, second stage. Predisposing causes, scabies and dyspepsia; duration 3 years. On 24th February, 1925, skin clip taken from right cheek bacteriologically positive; on 18th December, 1925, erythematous patches disappeared and skin bacteriologically negative and sensation regained on the anæsthetic areas of the lower limbs. Wassermann reaction negative. Had several erythematous thickened patches with thickening of lobes of ears.

Case No. 153.—T. S., aged about 30 years, second stage. Predisposing cause, syphilis; duration 3 years. Skin positive bacteriologically, but nasal mucosa negative. Wassermann reaction negative. Erythematous patch on the back was noticed at first.

Case 502.
Before Treatment.

Case 502.
After Treatment.

Case No. 446.—I. K., third stage. Predisposing causes malarial fever and gonorrhœa; duration 6 years. Skin bacteriologically positive and nasal mucosa negative. Wassermann reaction negative. Nodules were first noticed on his forehead and subsequently on other parts.

Case No. 456.—A. A., aged about 14 years, second stage. Predisposing causes malarial fever and constipation. Duration 10 years. Clip of skin from lobe of right ear positive bacteriologically. Wassermann reaction negative. Erythematous patch on left cheek with thickening of lobes of ears and anæsthesia of lower parts of right leg.

Case No. 502.—K., aged about 13 years, second stage. Predisposing cause, malaria; duration 12 months. Smear from skin clip bacteriologically positive and nasal smear negative. Wassermann reaction negative. A small erythematous patch on her left cheek was noticed at first; subsequently she had similar patches on the right thigh and forearm.

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Current Topics.

Discussion on Some Recent Developments in Our Knowledge of the Biliary Tract.

By EVARTS A GRAHAM, M.D.,

Professor of Surgery, Washington University School of Medicine; and Surgeon-in-Chief to Barnes and St. Louis Children's Hospitals, U. S. A.

(*British Med. Journ.*, October 16, 1926, p. 671).

DR. GRAHAM read the opening paper on the above subject at the last annual meeting of the British Medical Association. He began by stating that the known normal functions of the gall-bladder seem to be relatively insignificant—namely, the regulation of pressure in the biliary system and the concentration of bile by the absorption of water.

In 1918 observations were published by Dr. Graham which indicated that inflammatory changes in the liver were a constant accompaniment of cholecystitis. Later the microscopic examination of gall-bladders removed at operation convinced Dr. Graham that, since often more inflammatory change is found at the periphery than in the mucosa of the organ in what seemed to be the early and the less severe cases, too much emphasis had been placed by the pathologists upon the importance of mucosal infection in the pathogenesis of cholecystitis. Many cases of cholecystitis are due to a lymphatic spread from a hepatitis, some are doubtless due to hematogenous infections of the gall-bladder, and some are probably due to involvement of the mucosa first and are therefore contact infections.

The diagnosis of typical cases of cholecystitis, either with or without calculi, is usually easy by means of the clinical history and ordinary physical examination. But the conditions which give rise to the typical signs and symptoms are usually late effects of disease. It is desirable to have some means of recognizing the presence of disease before the late effects have occurred, and to have a means of recognizing the atypical and obscure cases.

The work of Abel and Rowntree, which showed that the chlorinated phenolphthaleins are excreted largely through the liver into the bile, offered the suggestion that if atoms of bromine or iodine should be substituted for chlorine a substance might then be at hand which would not only be excreted into the bile but would also render the gall-bladder opaque to the Roentgen ray.

In 1923 W. H. Cole and Dr. Graham, later in association with Copher and Moore, investigated this problem. Because of the high atomic weight of iodine the first substance which they used was tetraiodophenolphthalein, and they succeeded in demonstrating the fact that with this substance cholecystography is possible, at least in dogs. This substance is secreted almost entirely by the bile—approximately 98 per cent. as shown experimentally in the dog. Recently they found that phenoltetraiodophthalein not only produces good shadows of the gall-bladder, but also colours the serum sufficiently after alkalinization of it to make it possible to employ it as a test of hepatic function in a manner similar to the Rosenthal test with phenoltetrachlorphthalein. Therefore, this substance may be used simultaneously for cholecystography and for tests of hepatic function. It also colours the urine after alkalinization, but since only about 2 per cent. of it is secreted in the urine it will probably not be of much value as a test of renal function.

The densest shadows will be found in normal subjects, there may be no shadow at all, or only a faint one, if the liver is unable to excrete the substance normally if the cystic duct is occluded, or if the gall-bladder is unable to concentrate its contents because of a diseased wall. Moreover, as bile is poured out from the gall-bladder into the common duct, it is obvious that the shadow will diminish in size and gradually disappear entirely.

Cholecystography is really a means of studying the function of the gall-bladder rather than an indication of the exact pathological lesions present. This method of examination provides a means of determining the state of the only two functions of the gall-bladder known—namely, the regulation of pressure within the biliary tract, and the concentration of the contained bile.

The enthusiasm with which this procedure has been almost universally received has been astonishing. However, the method of administration of these substances which they proposed in their first publications has been considerably modified by later workers.

There are two serious objections to the oral method: one is the uncertainty of the amount of the substance absorbed, and the other that many toxic disturbances, such as diarrhœa and vomiting, occur. For these reasons, at the Barnes Hospital, the authors adhered rather closely to the intravenous method, almost as outlined in their early papers and as carried out in Great Britain by Cohen and Roberts with tetrabromphenolphthalein. Improvements in manufacture of the tetraiodophenolphthalein has resulted in their hands in an almost complete absence of toxic reactions after the intravenous administration. The use of the new isomeric compound, the sodium salt of phenoltetraiodophthalein, however, will almost completely obviate toxic reactions. In ninety-seven successive cases in which it was used intravenously there have been no severe reactions.

The authors' technique is thus described:—

For the adult of average size 3 or 3½ grams of the sodium salt of tetraiodophenolphthalein, or 2½ grams of the sodium salt of phenoltetraiodophthalein, are dissolved in from 30 to 50 c.cm. of water, filtered, and sterilized in a boiling water bath for fifteen minutes. The solution is slowly injected with a syringe in the morning between 8 and 9 o'clock, preferably in two equal doses, half an hour apart. Dividing the dose tends to eliminate any risk of a toxic reaction. If given very slowly, however, over a period of ten or fifteen minutes, in one dose there is but little danger of a reaction. Case has recommended the prompt injection of 0.5 c.cm. of adrenaline if any symptoms of a severe reaction occur, such as fall in blood pressure. They have found this helpful in the few cases in which it seemed necessary. Breakfast is omitted in order that the duodenum may be empty during the period of concentration in the gall-bladder. For lunch the patient may have a liquid diet, but it should contain little or no protein or fat. The evening meal may be taken as usual. They formerly employed large doses of sodium bicarbonate by mouth, lately, however, they have abandoned the use of the bicarbonate because it has seemed unnecessary. Roentgenograms are made four, eight, and twenty-four hours after the injection. Dr. Sherwood Moore, the director of the department of radiology, prefers not to use the Potter-Bucky diaphragm. A series of films is essential in order to gain information concerning the concentrating function and the changes in size of the gall-bladder.

An important modification of this procedure has been made by Miliken and Whitaker, who give a meal containing fat in order to determine the ability of the gall-bladder to reduce its size promptly.

Accuracy of interpretation depends very largely upon experience with the particular method of administration. Normally, after the intravenous method described above, a faint shadow of the gall-bladder will usually be visible in about four hours. At eight hours it will have increased in density and will often be somewhat smaller, probably because of reduction in volume by concentration. At twenty-four hours the shadow will usually be nearly or completely gone. If, however, no food at all has been taken since the injection the twenty-four-hour shadow may be the densest and smallest of all because of marked concentration.

The chief points in making the diagnosis of cholecystic disease are: (1) Failure to obtain a shadow when the technique has been properly carried out. They agree with Carman, in his statement based on a study

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of 1,100 cases, that a failure to obtain a shadow is unexcelled in diagnostic value. (2) Filling defects. Soft calculi which are otherwise invisible frequently are seen in the cholecystograms as "negative" shadows, or filling defects. They occupy space in the gall-bladder which would otherwise be filled with the opaque substance. Many small stones often produce a mottled appearance which is very characteristic. (3) Irregularities of contour, denoting adhesions, diverticula, etc. (4) Variations from the normal in density of shadow, in the time of appearance and disappearance of the shadow. These last criteria are more difficult points to interpret than the former, and they constitute most of the failures in diagnosis. Other difficulties of interpretation have been encountered in certain cases of hepatic enlargement of unknown etiology.

Up to May, 1926, the authors examined at the Barnes Hospital 1,041 patients with tetraiodophenolphthalein and 103 with phenoltetraiodophthalein, a total of 1,144 patients with one or the other of the iodine compounds. In this series there were 128 operations at which the gall-bladder was removed and an opportunity provided for a microscopic examination of it. On this basis the operation confirmed the Roentgen-ray diagnosis in 124 cases.

They have had no alarming symptoms in any of the last 500 cases. The reactions have been headache, dizziness, slight nausea, weakness, nervousness, diarrhœa, vomiting, severe nausea, pain in back and abdomen, fever, "smothering," chills, and urticaria. The use of phenoltetraiodophthalein is accompanied by fewer reactions than tetraiodophenolphthalein.

Cholecystography, when properly performed, will give evidence of disease before it is recognizable by any method short of microscopic examination of the gall bladder, but diagnosis of normality in the presence of a clinical history and clinical findings suggestive of cholecystitis should be made with caution, and only after experience with the method.

Recently it has been possible to show that the gall-bladder can empty itself by calling into play only the two mechanisms of a gradual washing out by the inflow of fresh liver bile and of elastic recoil.

Sosman, Whitaker, and Edson have found that a meal containing egg-yolk and cream can reduce the cholecystographic shadow of the gall-bladder to about one-tenth of its former size within the brief time of one hour and forty-five minutes. Copher and Kodama have found that oleic acid is even more powerful in this respect.

Dr. Arthur F. Hurst, M.A., M.D. OXON., F.R.C.P., Physician to Guy's Hospital dealt with the Diagnosis and Treatment of Cholecystitis and the Prevention of Gall-stones.

Gall-stones are found in about 10 per cent. of the bodies of all people dying after the age of 20. Since in most, if not all, cases their formation is preceded by cholecystitis, and as cholecystitis is often not followed by cholelithiasis, the former must occur at some period in the lives of a considerable proportion of all adults. It is the most common of all abdominal diseases. In spite of this it is comparatively rarely diagnosed, largely owing to the fact that until quite recently textbooks of medicine gave most inadequate descriptions of the symptoms and diagnosis of the common mild form of chronic cholecystitis, attention being almost confined to the comparatively rare and consequently much less important suppurative and gangrenous forms of the disease.

Chronic dyspepsia, which does not quickly yield to treatment, calls loudly for the help of a diagnostic team, consisting of a clinician, a radiologist, and a pathologist, since it is only by the use of certain modern methods of investigation, which require special experience for their performance and for the interpretation of the result, that cholecystitis can be diagnosed with a considerable degree of certainty, and a scientific basis can be obtained for the rational treatment of each individual patient. The investigation should be sufficiently complete to decide whether any other conditions, such as a gastric or duodenal ulcer, chronic appendicitis, caecal and ascending colon stasis, and achlorhydria or hyperchlorhydria, are associated with it.

A carefully taken history should in most cases arouse suspicion when cholecystitis is present. Everybody should be familiar with Sir Berkeley Moynihan's classical description of the "inaugural symptoms of gall-stones," which are now recognized as the symptoms of cholecystitis, having no direct connexion with the presence of stones. The abdomen should, if possible, be examined at a time when the patient is actually suffering from discomfort; the gall-bladder itself is then always found to be tender. In this Dr. Hurst was surprised that Dr. Graham did not mention the chief use in the milder forms of cholecystitis, as distinct from gall-stones, of the wonderful new method of visualizing the gall-bladder which we owe to him—the palpation of the visualized gall-bladder under the *x*-ray screen. There are many cases of slight, non-surgical cholecystitis in which this is the only radiological sign of disease. He quite failed to confirm Rosenow's theory of the streptococcal origin from the teeth and tonsils of most cases of cholecystitis, as the infection is almost always due to pathological types of coliform bacilli, and streptococci have only been found in a single case.

The medical treatment of cholecystitis, in the stages in which the bile is infected but the wall of the gall bladder is either not infected at all or only superficially or slightly infected, often leads to complete recovery. Even in cases of gall-stones with infective cholangitis unless the symptoms are very urgent, a few days' preliminary medical treatment will often convert a very dangerous septic operation into a comparatively safe one.

The treatment consists in attempting to sterilize the biliary passages by very large doses of urotropine and in promoting biliary drainage. Dr. Knott has shown that the urotropine acts as a biliary antiseptic in spite of the alkalinity of the bile, although it is inactive in alkaline urine and alkaline serum. Consequently its action on the bile is not impaired when sufficiently large doses of alkalis are given to keep the urine premanently alkaline in order to prevent the bladder from being irritated by formalin, which is set free in acid urine. A mixture is prepared containing 100 grains of urotropine to the ounce, and another containing 1 drachm each of sodium bicarbonate and potassium citrate to the ounce. Half an ounce of the former and one ounce of the latter are given after breakfast, after tea, and after a tumbler of milk or water last thing at night. The dose of the urotropine mixture is increased by 1 drachm each day until the full dose of 100 grains of urotropine is taken three times a day. This can often be continued for many weeks without unpleasant symptoms; if any bladder irritation occurs, the dose of urotropine is temporarily reduced, and, if the urine is found to be occasionally acid, more alkali is added to the second mixture. Dr. Knott has recovered urotropine from the bile obtained through a duodenal tube, and in several patients has actually demonstrated the sterilization of infected bile. In most cases he has also given the patient a course of vaccine made from the organism isolated from the bile.

Biliary drainage is promoted by giving magnesium sulphate in concentrated solution one hour before breakfast, in just sufficient quantity to get the bowels satisfactorily opened without the use of any other aperient. Dr. J. F. Venables, has demonstrated that magnesium sulphate given in this way produces just as good a flow of bile as when it is introduced direct into the duodenum, so that the unpleasant method of non-surgical biliary drainage recommended by Lyon, in which a duodenal tube is passed every day, is quite unnecessary.

When achlorhydria is present one drachm or more of dilute hydrochloric acid should be given in about five ounces of sweetened water, to which the juice and pulp of an orange may be added, half an hour before breakfast, to help to sterilize the stomach and duodenum, and, with the addition of pepsin, as a beverage with

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lunch and dinner, in order to make gastric digestion possible. When hyperchlorhydria is present the pain, which is then often very similar to that of duodenal ulcer, can generally be relieved by taking half an ounce of olive oil before meals. This has the additional advantage of causing a flow of bile by a similar reflex to that produced by magnesium sulphate.

GENERAL DISCUSSION.

Dr. F. A. Knott (London) said that during the past three years he had made with Dr. J. F. Venables, slightly over three hundred examinations of specimens obtained by the Einhorn tube.

Dr. C. F. W. Illingworth (Edinburgh) had kept accurate records of 132 cases. The intravenous method was used, 4 or 5½ grams of sodium tetraiodophenolphthalein being injected. Recently he had introduced a slight modification.

A few hours before the injection a large dose of magnesium sulphate was given, with the object of securing a partial emptying of the gall-bladder and ducts, which were then refilled by the fresh dye-laden bile from the liver. Only once had any alarming sequel occurred. In this case there was a rather serious collapse before half the fluid had been injected, the collapse persisting for nearly half an hour. A rigor occurred once, but it was transitory and passed off without later ill effect. One patient had a severe headache and one complained of tingling in the limbs. Of the remainder, 61 per cent. suffered no discomfort; the others had varying degrees of nausea or vomiting, never alarming, and invariably passing off in a few hours.

In 111 cases Professor Wilkie had carefully examined the gall-bladder at the operation. Dr. Illingworth had classified this series in various groups to illustrate the value of the test.

Group 1.—In 39 cases no gall-bladder shadow was present in the *x*-ray film (which was usually taken twelve to fifteen hours after the injection). Of these patients, 35 were found to present gross disease of the gall-bladder or ducts, stones, neoplasm, or well-marked cholecystitis, thus confirming the *x*-ray diagnosis. In the remaining four cases the gall-bladder and ducts appeared quite healthy. The reason for this discrepancy was to be found, perhaps, in their technique. In these cases radiograms were taken at one period only, some twelve or fifteen hours after the injection. If a whole series of exposures had been made at varying intervals after the injection a correct diagnosis might have been made.

Group 2.—This group included 53 cases in which a gall-bladder shadow of apparently normal appearance was obtained. The result of this group were rather less satisfactory. In 45 the diagnosis was confirmed, the gall-bladder being healthy. In the remaining 8, however, the investigation was misleading. One gall-bladder contained stones, few in number and too small to be visible on the *x*-ray film. In 4 a slight degree of cholecystitis was visible to the naked eye. The remaining 3 cases were of particular interest. At operation the gall-bladders were of fairly healthy appearance and no stones were present. The clinical histories had, however, been very typical, and it was thought advisable to carry out a bacteriological examination of the bile and the gall-bladder wall. In all 3 cases culture of one or both tissues gave a growth of a virulent diplostreptococci.

Group 3.—This group was a smaller one and required little description. It included those 8 cases where gall-stones were visible within the shadow of the gall-bladder. It was a point worth mentioning that the concentration of the dye around the stones might be of value as an index of the condition of the gall-bladder wall and as a guide to operative treatment.

Group 4.—In 9 cases the cholecystogram was poor and ill-defined, and in these cases gross disease of the gall-bladder was found to account for the appearance. Reliance could only be placed on the density of the gall-bladder shadow as an index of its functional capacity if the radiogram was a good one; in very stout patients this might be difficult to obtain.

Group 5.—There was only one case in this group. The cholecystogram showed a well marked hour-glass deformity, which was found later to be due to a very localized induration of the gall-bladder wall.

Group 6.—In patients suffering from obstructive jaundice the investigation had proved of no value. Whether the obstruction was complete or partial, the amount of dye excreted by the liver was insufficient to produce a shadow.

Group 7.—The last group included those cases in which a palpable swelling was present in the upper abdomen. In these cases cholecystography had proved of great value. The position of the lump in relation to the gall-bladder could be accurately defined and the differential diagnosis was thereby narrowed down. Their series included 5 such cases, and in each the investigation had been of real value. One patient, previously operated upon for an endothelioma in the thigh, developed a swinging temperature and a palpable swelling in the right upper quadrant of the abdomen. Cholecystography revealed a well defined gall-bladder shadow below the level of the lump; a diagnosis was made of secondary metastasis in the liver, and the patient was saved a further operation. In another patient a large epigastric swelling was similarly diagnosed as situated above the gall-bladder, and was found to be a large hydatid cyst in the liver. In a third patient the gall-bladder was seen flattened and compressed upwards by a tumour which proved to be in the transverse colon. The fourth case was similar, the gall-bladder being compressed upwards by a growth in the colon. In the last case a hydronephrosis was responsible for displacing the gall-bladder and also rotating it into a horizontal position.

Their conclusions were that cholecystography was of distinct practical value. The absence of a gall-bladder shadow was strong evidence of gross disease. A good shadow excluded gross disease, but could not be expected to give evidence of minor pathological changes. In jaundiced patients the investigation was of no value, though in their experience it was devoid of risk. Lastly, cholecystography was of considerable assistance in the differential diagnosis of abdominal tumours.

Dr. T. Izod Bennett (London) employed the oral method almost exclusively; not from fear of toxic general symptoms so much as from the risk of occasional venous thrombosis following slight extravasations. The difficulties of the oral method were purely those of obtaining a capsule which would be dissolved in the intestine after passing the pylorus unchanged. His last fifty cases had been almost uniformly successful, nor had general toxic symptoms ever been grave. In the absence of stone and gross infection, cases of gall-bladder disease did exceedingly well with medical treatment.

The important dietetic principles in biliary tract disorders were: (1) to give a diet of carbohydrates and vegetables which would improve bowel evacuation and throw a minimal strain on the liver, and which would also combat tendencies to obesity; (2) to give water in abundance; and (3) to utilize such foods as would promote biliary drainage. Natural waters with a rather large salt content were usually better than purer waters; normal saline was, he believed, an excellent drink for these patients. The food which most readily provoked emptying of the gall-bladder was egg-yolk, and he was trying the effect of giving beaten raw egg-yolk to his patients daily. As to drug treatment, he was convinced that magnesium sulphate in solution, taken on waking when the stomach was quite empty, was very useful.

Bile salts and urotropine were the other drugs which were useful, and these he prescribed in full doses. His experience was that by these methods most satisfactory results could be obtained in a very considerable proportion of cases.

Dr. J. H. Anderson (Ruthin) uses the oral method almost exclusively, salol coated pills. The intravenous

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was perhaps more accurate as the dye was more under control; but the oral method was sufficiently accurate for routine use, besides having certain definite advantages. The possibility of pills remaining unabsorbed or being vomited was checked by a screening of the abdomen and radiological examination of any vomit. The dyes used had been the sodium salt of tetrabromphenolphthalein and tetraiodophenolphthalein prepared by Malincrodt of St. Louis, and in a few cases the sodium salt of tetraiodophenolphthalein prepared by Martindale of London; in all cases solutions were prepared a few hours before use and pills not more than ten days. Ill effects had been insufficient to cause any alarm, and in 20 per cent. of cases there was no reaction at all. In the oral cases the unfavourable sequels were limited to nausea, vomiting, and diarrhœa. Nausea was transient as a rule, but had once lasted for ten hours in a case where the gall-bladder did not fill, and where three stones were found at operation. Vomiting was never severe and never exceeded three times. The largest vomit was in a case where the dye had been dissolved in 60 c.cm. of water.

The Madras Medical Register.

THE Madras Medical Register is a publication which will be of interest to many of our readers. It contains a warning notice with regard to forms of professional misconduct, notes on medical registration in Madras, the text of the Madras Medical Registration Act, 1914, and a complete list of all registered medical practitioners in the Province, with their qualifications, date of registration and professional address. It is published annually by the Superintendent, Government Branch Press, Madras, at a cost of Re. 1, and is obtainable from the official agents for the sale of Madras Government publications, including the Superintendent, Diocesan Press, Vepery, Madras; Messrs. Thacker, Spink and Co., Calcutta; Messrs. Thacker and Co., Bombay; and the Burma Book Club, Rangoon.

Indigenous Systems of Medicine.

WE welcome most cordially the appearance of a small brochure by Dr. W. Burridge of King George's Medical College, Lucknow, on *Indigenous Systems of Medicine and Medical Science.** Dr. Burridge is an uncompromising realist, and he writes concisely, forcibly, and in admirable literary style; he has no use for attempts to make unscientific medicine pseudo-scientific, for it cannot be done; nor for attempts to degrade modern scientific medicine of to-day into a far inferior imitation of itself. In these days when every cult from that of herbalist to that of Ayurved clamours for State aid, it is time that someone should set down the truth honestly and without compromise, and that Dr. Burridge has done.

"Among the many things at present in unrest in India," he writes, "are the indigenous systems of medicine. Their foundations of anatomy and physiology are now known even to their chief admirers not to be of the nature of firm solid masonry, as once supposed, but instead to be almost entirely of the speculative or imaginary type. Reluctant, however, to face the implications of imaginary foundations, these admirers would now turn to 'research' in the hope of finding the superstructure of much more solid worth, and with that end in view Ayurvedic and Unani research institutes have been or are being built, chiefly at the taxpayer's expense.

"The object of the present work is to point out that orthodox medical practice in Europe was for many centuries a combination of the systems termed indigenous in India to-day, that the imaginary nature of their foundations was discovered several centuries ago, and that perturbed opinion thereafter turned to the superstructure, which research next showed to be as bad as the foundations. So long as facts are treated as facts, research on these indigenous systems in India can only give the results already obtained in Europe, and it would seem a waste of effort, time, and money to do the work again.

"An endeavour has also been made to indicate the tremendous gap between scientific medicine and medical systems."

Turning to the main subject matter of the book, Dr. Burridge traces the evolution of the mediæval English practitioner from classical and ancient medical systems. Someone—Sir Arthur Keith, if we remember rightly—has wittily said that medicine had its first origins in priestcraft, witchcraft, and leechcraft; it is against a return to that state of affairs that our author protests. He traces briefly the history of ancient Greek medicine and of ancient Hindu medicine. The Hippocratic school appropriated ancient Hindu medicine; they found Ayurvedic doctrine good in general but imperfect in detail, and accordingly remodelled it, replacing wind by blood and subdividing bile. This alloy of East and West then passed through the Arabian school to the early English physicians of Chaucer's day. "Western medical practice of that day, based on these theories, was simple and direct. The body was depleted of its excess of humour by blood-letting, vomiting or purging, and the humour itself 'corrected' or made of proper constitution by an alterative. Astrology came in to determine the proper time to give the alterative."

There ensued a long period of history during which there was no advance. "To mediæval Europe these ancients had done their work so well as to leave to the modern nothing more to discover. Did Galen and Aristotle disagree concerning the number of teeth possessed by a horse, then the learned doctors would spend months in mental worry and dispute, trying to find some formula, or group of words, reconciling two conflicting statements, but never dreamt of looking into a horse's mouth, or asking a groom the way to tell its age."

Vesalius (1514–1564) was the first to modify the ancient creeds when in 1542 he published his celebrated work *Concerning the Structure of the Human Body*, and laid the foundations of modern anatomy. Then came Harvey's discovery of the circulation of the blood, which laid the foundation stone of modern physiology. It was now clear that the ancients had known but little or nothing; the road was once more open for enquiry. The nineteenth century opened and was to see the tremendous and revolutionary discoveries of Pasteur—who founded modern bacteriology, and of Lister—who founded modern surgery; also the discovery of anæsthetics.

From this origin modern scientific medicine began to permeate modern tropical medicine, and the days of the great pioneers of modern tropical medicine, of Vandyke Carter, Timothy Lewis, D. D. Cunningham, Sir Ronald Ross, Sir David Bruce, Sir William Leishman, ensued. To such an extent did tropical medicine advance that its rate of progress has outstripped that of modern non-tropical medicine.

That doctors bury their mistakes is a common cynical remark with a foundation of fact. Yet two generations ago post-mortem examinations showed that the doctors were nearly as often wrong in their diagnosis as right; today it is exceptional to find them wrong. Generation by generation modern medicine has accumulated a vast and progressive store of knowledge. Bright's disease must have existed for centuries before Dr. Bright of Guy's Hospital found that a particular group of symptoms during life was associated with a particular abnormal state of the kidney after death; yet the disease had never previously been identified as a separate entity. The most remarkable feature of modern scientific

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* *Indigenous Systems of Medicine and Medical Science.* By W. M. Burridge, D.M., M.A. (Oxon.), Professor of Physiology, King George's Medical College, Lucknow. Allahabad. *The Pioneer Press*, 1926. Pp 50.

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medicine is that treatment is based on the *diagnosis* of the disease from which the patient is suffering; not upon his *symptoms*. It is the quack who treats his patients in accordance with the more obvious symptoms which they show; the medical practitioner knows that unless he can base his treatment upon ascertained and proved diagnosis he may do more harm than good. We have still to accept the Indian chowkidar's returns of death from "fevers"; but in our hospitals we strive to find malaria or kala-azar or other causative parasites in the patient's blood films.

This inheritance is of immense value, because with the increasing accuracy of observation and investigation, the value of the material becomes ever greater and greater. In fact it is to-day so voluminous that it requires abstracting and analysis in almost every branch of medicine, if its full value is to be made use of. Around the single subject of appendicitis, for instance, there is now a far more voluminous literature than Charka or Hippocrates ever wrote about the whole body of medicine. To-day the English farm labourer can demand from the modern hospital or from his panel practitioner an accuracy of diagnosis which the Queen-Empress could not have availed herself of thirty years ago. Should he fracture a limb a completely accurate diagnosis of the state of affairs can be obtained under the *x*-rays, and it can be ascertained under *x*-rays whether the fracture has been properly set or not. And the end is not yet; we are but at the beginning of still vaster expansions. Patients can sue medical practitioners for lack of skill, but on the other hand no claim can be made against a *vaid* or *hakim* for any greater degree of skill than that which existed two thousand years ago.

In chapter XIII the author turns to a most interesting analysis of the methods of the Indian indigenous systems. Essentially the *vaids* and *hakims* are compounders and prescribers of drugs. The death-rate from appendicitis in their hands is 10 per cent. as against 0.3 per cent. under modern surgical methods. "Wherever death is the possible issue of the case, *vaids* and *hakims* will leave behind more dead than the scientific man. That in itself justifies abolition of *vaid* and *hakim*, and their replacement by the better trained man, but the fact has to be faced that trained men are not yet available in sufficient numbers..... For the present, then, *vaids* and *hakims* are there and must remain there, but so long as they are there, India will keep what for Europe would be terrible death-rates." It cannot be too forcibly emphasised that modern scientific medicine is international, and not "Western"; it knows no barriers of country or continent; it explores and acquires knowledge wherever available. "Charka's physiology was a series of inspired puzzles; he wrote about wind and bile, but perhaps he meant ductless glands—or perhaps he did not. What he really meant is now and for ever in the future uncertain..... So long as they are given their correct value as speculations concerning what Charka might have said had he known more, no harm is done; but when they lead to a waste of public money the matter has a more serious aspect. The financing of Unani and Ayurvedic institutes by Governments in the hope of finding some soul of goodness in them is precisely on a par with the same Governments financing archery clubs to find out the possibilities of the bow and arrow in modern warfare..... It may well be asked if there are any possibilities at all in indigenous medicine. The answer is that *vaids* and *hakims* probably know of many useful drugs, but that their estimates of the usefulness of these drugs will require very careful examination on scientific lines before they can be accepted." Digitalis was introduced into modern medicine by an old Warwickshire country woman telling an eighteenth-century Birmingham physician that foxglove leaves were good for 'the dropsy.' He tried them, and found them good. But dropsy is a symptom of some fifty different diseases; digitalis was tried for all, and it fell into disrepute. Then the experimental pharmacologists set to work to examine its action on different organs of the body; they standardised it, and the modern cardiologists established its true value, and the cases in which it should or should not be prescribed. The same might be said of dozens of other drugs; ipecacuanha was formerly recognised as a drug of some value in dysentery; to-day emetine is reserved for proved cases of amœbic dysentery, when its use is invaluable.

Scientific medicine will always be proud to acknowledge the past; to accord to Hippocrates, Galen, Charka, and Susruta the niches in history that are due to them. Their want of knowledge was not to their discredit. What they knew was entirely to their credit, and it made them richer in that knowledge than any of their contemporaries or predecessors. "But they did not build palaces to endure for ever, but buildings that were marvellous for their age. We can admire and protect what is left of what they built, as relics, but not as habitations."

* * * * * * * *

We trust that we have given some resumé of Dr. Burridge's most fascinating little book. It is dispassionately yet forcibly written. It states the facts. A politician may be content with a "gesture"; a medical man strives for reality. There can be no two or more "systems" of medicine in the world of to-day; there can be but a universal and scientific system of modern medicine—with national or local medical councils and pharmacopœias probably, and with national and local interests—but all of them parts of an incorporated and world-wide whole.

A Modern Radiological Department.

WE have received by a recent mail a reprint from the *Electrical Review* of October 26th, 1926 of a most interesting account of the new Radiological Department of the Royal Infirmary at Edinburgh, which was opened by H. R. H. the Duke of York on October 9th, 1926. The Department is probably the last word to date in radiological and electro-therapeutic work, and abstracts from the account given by the *Electrical Review* may be of interest to our readers:—

The Exclusive Electro-Medical Equipment of the Edinburgh Royal.

THE new Radiological Department of the Royal Infirmary at Edinburgh, which was formally opened on October 9th by the Duke of York, is claimed to be the largest and most completely equipped institution of its kind in Europe; indeed, it is doubtful if its equal exists in any country. Moreover, it is also probably the only department of its kind which has been planned, built, and equipped from start to finish entirely for *x*-ray work and electro-medical treatment, which is the logical method of attaining the high degree of efficiency demanded in modern hospitals.

The new building is 160 ft. long, with an average width of 60 ft., and consists of a basement and two floors; the structure has a steel framework throughout, with reinforced concrete floors and roof, the latter having been designed flat to support another floor, if necessary. The main walls have Craigmillar stone and precast concrete stone dressings, and adequate protection against *x*-ray radiation is afforded by the interior lining of the walls, which consists of barium slabs coated with barium plaster, the ceilings and floors having been similarly treated also.

Each floor is devoted to a different purpose; the basement houses all the machinery, large storerooms, and a mechanics' workshop. On the ground floor are the various rooms of the radiological section, and on the first floor the electrical treatment and massage work are carried out.

The machine room contains a G.E.C. motor-generator of 42 kw. supplying 200-volt, 50-cycle alternating current for all purposes throughout the Department, a motor-generator of 1 kw. supplying 80-volt d.c. at constant potential at all loads for electrical treatment purposes, and a 3 kw. rotary convertor operating on the 230-volt direct-current main supply; this latter machine

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is for use with an emergency outfit. All the switchgear for these machines is erected near to them, including an eight-way distributing panel, where the alternating current from the large motor-generator is split up and conveyed by separately-protected circuits to the various pieces of apparatus. A special cable from the town's network supplies 460-volt direct current for driving the large motor-generator; at its point of entry in the machine room it is split up by means of a large d.c. distributing panel so that 230-volt direct current is available for lighting and power purposes throughout the Department.

This main direct-current light and power board, together with four sub-main control boards on the ground floor, were supplied by the Edison Swan Electric Co., Ltd.

Three oil-immersed high-voltage transformers are also installed in the basement, or machine room, each being directly under an *x*-ray room on the ground floor; the high-voltage current is conducted through the ceilings into the rooms above by means of conductors passing through special porcelain insulators. Each transformer is capable of an output of 100 milli-amperes at 150.000 volts (peak value), being controlled entirely from a trolley-type switchtable installed in each appropriate radiographic room on the ground floor. By this means the noise and vibration of the moving parts are kept out of the *x*-ray rooms, and work can be carried on in absolute silence. Each transformer and mechanical rectifier is enclosed in expanded metal cagework, on the outside of which is an illuminated sign which lights up immediately the operator in the room above starts the apparatus.

One special feature of the power installation is the B.T.-H. Tirrill voltage regulator, which operates in conjunction with the 42-kw. motor-generator and enables the voltage between no load and full load on the *x*-ray transformers (when all are being used at once) to be kept practically constant, any voltage variation due to load, or fluctuating supply pressure, being corrected and restored to normal within a fraction of a second. It has so often been the experience of operators of *x*-ray equipment than an unavoidable fluctuation of supply current results in inconsistency of radiographic results, that the question of voltage variation has become a very important one. It can, however, be satisfactorily dealt with as explained above.

On the ground floor, the chief rooms are as follow:—Deep therapy treatment room, superficial therapy treatment room, three radiographic and fluoroscopic rooms, a lecture room, and another containing an emergency outfit. The patients are received at the office next to the entrance door, whence they go to the waiting halls at either end of the corridor; they then proceed as required to the dressing rooms before passing into the *x*-ray or treatment room itself.

The equipment in the deep therapy room is used chiefly for the treatment of malignant or cancerous growths, and is of a special type employing high-potential transformers, condensers, and rectifying valves of the hot cathode type. Two patients may be treated separately or at the same time with the one set of equipment, which is capable of a continuous current output at 250,000 volts of 10 milliamperes. The *x*-ray tubes are entirely surrounded by 5 millimetres of lead, except the small aperture through which the *x*-rays are emitted. In all the rooms in the Radiological Department the walls are lined with specially manufactured tongued and grooved barium blocks which afford protection against *x*-rays equal to that of over 4 mm. of lead. The switchgear is located outside the treatment rooms, so that the operator works in complete safety from *x*-radiation. The doors are covered with 3 millimetres of lead, and special lead-glass windows through which the patients may be observed during treatment also provide the same degree of protection.

A smaller installation of the same type serves another room wherein such superficial work as ringworm treatment is undertaken; the output of this smaller continuous-current plant is half that of the larger one, namely, 10 milliamperes at 125,000 volts. A system of bells communicating with an indicator in the control room enables each patient to attract the attention of the operator, if necessary. In passing, it is interesting to note that an oscillograph record of the current curve of the above type of equipment resulted in an almost straight line, which means that the voltage generated is as near as possible direct, and therefore, ideal for *x*-ray work.

Three separate rooms are used for radiographic and fluoroscopic purposes, each having its own high-potential transformer situated in the basement as mentioned previously. The first is the radiographic room wherein the majority of the out-patients are dealt with. It contains a protective cubicle for the operator, built of protective blocks such as have already been described, which houses the portable trolley switchtable, controlling the transformer in the basement. Special overhead corona-less high-voltage connections in the form of aluminium tubes fixed to the ceiling convey the current from the point where the insulators emerge from the floor to the two tube stands and *x*-ray couch which the room contains. It is not necessary to make any alteration in high-voltage connections when changing from one piece of apparatus to another; all the operator has to do being to pull a cord, which changes over the connections automatically. The box containing the *x*-ray tube underneath in the case of the couch has lead protection equal to 3 millimetres of lead, and the tubes in the adjustable stands for over-couch work are also fully protected.

The second radiographic room, is reserved for stomach cases, and is equipped with a new type of screening stand, comprising three separate units, an *x*-ray couch, and a tube stand similar to that described previously. A feature of this room is a special piece of apparatus whereby a series of radiographs of the stomach may be taken very rapidly, the whole procedure being practically automatic. Each picture can, however, be seen on the fluorescent screen before the exposure is made.

The third room is given over to the examination of chest cases, the equipment comprising a three-unit screening stand similar to that in the stomach room, an *x*-ray couch, a tube stand for over-couch work, and a special form of apparatus for investigating the movements of the heart radiographically. This last instrument embodies several improvements suggested by Doctor Robert Knox, who first constructed a machine of this type at the Cancer Hospital, London.

A complete *x*-ray unit is installed in the emergency room, which can be operated from its own rotary converter quite independently of the 42-kw. motor-generator, and enables any case to be dealt with when the machine room has closed down for the day. The outfit is capable of carrying out all types of radiography, and is particularly simple to operate, thus being very suitable for use by any member of the Infirmary staff who may not be very familiar with *x*-ray work.

On the wall in this room is fixed a dental *x*-ray outfit of unusual design: an adjustable arm carries at its extremity all the necessary parts, consisting of a high-potential transformer, oil-immersed and capable of an output at 45,000 volts (r.m.s.) of 10 milliamperes; a current stabiliser, and an *x*-ray tube protected with a covering of lead glass. These items are all contained in a metal tank measuring 9 by 7 by 7 inches, and there is absolutely no danger of either patient or operator receiving an electric shock of any sort, all dangerous parts being out of reach and immersed in oil, which feature is a great convenience for dental work wherein the tube is brought comparatively close to the patient.

A lecture room large enough to accommodate 40 students is equipped principally with a projection lantern, 24 illuminated viewing boxes for inspecting negatives, and two stereoscopes. Illuminated viewing boxes and a stereoscope also form part of the furniture in the radiologist's and his assistant's rooms, where

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the films exposed during the day may be inspected and reported upon.

All the developing and photographic work is carried out in the Department itself, a dark room on the ground floor having been equipped with the latest appliances to enable the large number of negatives exposed each day to be quickly dealt with; it is so situated that exposed films may be passed into it from the various radiographic rooms through light- and *x*-ray proof apertures, and new films taken from the dark room as required.

The first floor is occupied by the Electrical Treatment Department.

One room is equipped with remedial exercise and gymnastic apparatus only. The natural lighting and ventilation of this room, in common with others throughout the Department, are particularly good, making the working conditions very pleasant. Ventilation is efficiently carried out by means of a system of air ducts and high-speed electric suction fans in the roof tower; extraction takes place at the ceiling level, fresh-air inlets being provided in all rooms on the ground level. The building is heated, as is the whole Infirmary, on the vacuum steam radiator system.

Adjoining the gymnasium are two large rooms for male and female electrical treatment. Each is equipped with wall-type treatment boards from which various types of interrupted and galvanic currents can be obtained; it is these boards which are supplied by the 80-volt motor-generator in the basement. A Schnee bath with unbreakable receptacles for the arms and legs is installed in each room, together with many other modern appliances, including diathermy and high-frequency apparatus. Plain massage couches are placed round the walls of each room on which the patients recline while undergoing treatment.

At the extreme end of the corridor is a laboratory where any experimental or research work may be conducted.

It is useful to have a small room where any type of treatment can be given in cases requiring special attention, and with this idea in mind one room was equipped with a treatment board on the wall, diathermy apparatus with condensation couch, etc., while a smaller room contains mercury-vapour arc lamps for use for both general and local ultra-violet ray treatment. General irradiation by carbon-arc lamps (artificial sunlight treatment) has been provided for by equipping two rooms, one for male and one for female patients, with powerful hanging arc lamps, and also a portable type of arc lamp which is convenient for the treatment of patients who are unable to sit up. The control boards for these lamps are fixed to the walls of the rooms, but an emergency switch outside in the corridor will switch off both lamps if necessary.

The building was designed by Mr. T. W. Turnbull, Master-of-Works, and erected under his supervision.

Messrs. Watson & Sons (Electro-Medical), Ltd., Sunic House, Kingsway, London, W.C. 2, were entrusted with the work of designing the Department in respect of the *x*-ray and electro-medical apparatus, and were responsible for the supply and installation of this equipment.

Dr. J. M. Woodburn Morison, M.D., is radiologist to the Infirmary. Modern ideas call for a very high standard of efficiency in *x*-ray work, and not only does this new Department, which has cost approximately £52,000, meet all reasonable requirements in this respect, but it also marks a very important step forward in the science of radiology.

Thrombosis of the Spermatic Veins following Amœbic Dysentery.

IN the editorial in our issue of October 1926, we drew attention to the recent work by American observers on the possibility of *Entamœba histolytica* invading the blood stream and causing infection of organs other than the liver and brain, and mentioned Warthin's case of apparent infection of the epididymis with this parasite. In this connection the following case, reported by Dr. J. W. Tomb in the *Transactions of the Royal Society of Tropical Medicine and Hygiene* for November 1926 (Vol. XX, No. 4, p. 288), is of considerable interest:

A.B., a European male, aged 33, five years resident in India, with a clear history of freedom from venereal disease, was attacked with amœbic dysentery in October 1917, which was successfully treated by rest in bed for twelve days on milk diet, together with hypodermic injections of emetine gr. 1 daily, followed by oral administration of a course of emetine-bismuth-iodide. About two weeks after quitting bed he became aware of a sickening pain, which seemed to him to lie in his right testicle. On examination, the testicle and epididymis were found to be moderately enlarged and tender; the cord was markedly swollen, and situated on it, close to the external abdominal ring, was a small, exquisitely painful, nodule evidently caused by thrombosis of one of the veins of the pampiniform plexus. On account of pain he was unable to walk, and suffered also from nausea and loss of appetite. He stated that three years previously he had suffered inconvenience for some time from a pain in the same locality, somewhat similar in character but much milder in degree, and unaccompanied by nausea or any noticeable swelling in the testicle. This condition he attributed at the time either to the effect of a badly-fitting suspensory bandage which he was then wearing—but which he subsequently discarded—or to injury of the parts by the saddle of his bicycle on which he rode daily to and from his work. The treatment prescribed consisted of rest in an easy chair, with local applications of liniment of belladonna, under which the acute symptoms subsided in about three weeks, the condition gradually and completely clearing up within six months.

After the lapse of one year, during which time no symptoms of dysentery had manifested themselves, he was again attacked with this disease, which was similarly treated with emetine hypodermically and emetine-bismuth-iodide by mouth. On this occasion also, about two weeks after the acute symptoms of dysentery had disappeared and he had resumed his ordinary duties, the right testicle and cord became swollen and painful—examination again revealing thrombosis of one of the spermatic veins with a tender nodule situated in the same locality as before. Rest in an easy chair with local applications of belladonna was again prescribed, but although the acute symptoms, in this instance also, subsided to a great extent after the lapse of about three weeks, considerable pain and swelling of the cord and testicle persisted. During the succeeding six months he suffered from several relapses of dysentery, which were treated with numerous hypodermic injections of emetine; the right testicle and cord throughout this period remained swollen and painful; while a varicose condition of the spermatic plexus of the right side began to make its appearance. At this juncture he was invalided to England on six months' leave. During this period no further symptoms of dysentery were experienced, though treatment was entirely suspended and ordinary diet resumed. The tender nodule in the cord also diminished in size, with corresponding relief from pain, but the testicle remained distinctly swollen, and marked varicosity of the spermatic veins supervened, so that he himself described his scrotum as feeling to the touch like "a bag of worms."

It should, perhaps, be mentioned that towards the end of his leave in Europe the patient married, and though the pain and swelling in the cord and testicle did not wholly disappear for over a year and a half (during which time he suffered from several mild relapses of dysentery, treated on each occasion by hypodermic injections of a few grains of emetine), the varicosity of the spermatic veins cleared up within six months of his marriage and return to India, and has not since that time recurred, the condition now appearing to be permanently cured.

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Reviews.

GENIUS, SOME REVALUATIONS.—By A. C. Jacobson. Messrs. Greenberg, New York. Pp. 160. Price, $2.50.

We are quite sure that we approve of Dr. Jacobson's most interesting and exceptionally well written book, but we are far from sure that we approve of his main thesis, which is that genius is inseparable from degeneracy. "Ironically enough," he writes, "it is in the outcast, disinherited, vagabond, criminal, defective, insane and generally abnormal elements of humankind that genius germinates, never in the well-bred—eugenically speaking—right-wing of the race. Let the 'respectable' wince if galled by this challenging truth."

It is impossible to define genius. The old hackneyed definition of it as a capacity for taking infinite pains is certainly untrue; many geniuses are extraordinarily slipshod; thus Strauss wrote his compositions on any scraps of paper available—the backs of old envelopes, and the like; these he frequently lost, whilst they were occasionally illegible even to himself. The handwriting of most geniuses is illegible, though a bad handwriting is not in itself evidence of the possession of genius. Critics of the great military geniuses have defined genius as a capacity for making other people take infinite pains; yet even this definition is wrong; the stupider the general, the more his troops suffer. Genius is something which can only be recognised, and not defined. Yet Dr. Jacobson claims that genius is the expression of a creative secondary personality. The ordinary man is a mass of repressions and inhibitions—a "civilised" individual. When some toxin—alcohol, the toxin of tuberculosis or of syphilis—paralyses the higher and the inhibitory centres, then genius may awake. Not that it *will* awake—for the like toxin may produce a Prospero or a Caliban; but only under such conditions is genius born. Hitherto, our psychologists have studied the Calibans of the race; is it not time that they studied the Prosperos?

With his main thesis outlined, the author sets forth its full exposition by illustration and precedent, taking literary characters only—since to include others would make his work unweildy. Genius, he will have it, is frequently drenched in alcohol, sustained by alcohol, inspired by alcohol. "There has never been a time since Osiris, Bacchus, Ceres and Saturn disputed the honour of the invention of alcohol and its introduction among men, when it has not played a part in the intellectual activities and cultural progress of the world." Julius Cæsar was anything but a teetotaller, Cicero loved to dine with Lucullus, Pitt and Fox deliberately prepared their speeches under the excitation of excessive indulgence in porter and port wine. The veritable epidemic of alcoholism which occurred in the Elizabethan era in England was coincident with the great intellectual awakening of that age. And the outlook for New York is black indeed; she has no Mermaid Tavern, so she will never produce a Ben Johnson or a Will Shakespeare. Robert Herrick, one of the sweetest of British poets, has been termed the British Bachhus; *Don Juan* was written under the influence of gin. "Alcohol" writes Jack London "is the august companion through which one walks with the gods; the enemy of life and the teacher of wisdom beyond life's vision." But this problem is now of only academic interest in the States; "Highly respectable 'linnets singing on the wrists of kings' (and captains of industry) we shall have, but in the aisles of time no organ voices shall be heard again. The horns of our intellectual elfland blow faintly and no new planet swings into the ken of the watcher of the skies. Our Kultur has razed the cathedrals of the mind and only the squeak of the field mouse is heard over the ruins of our once mighty temples. Where once the wine-press of Horace and Anacreon stood, we shall manufacture synthetics..... Fairy forests are in process of conversion into subway shorings. Our poets, standardised by a board of censors, shall sing of the munition factory and the energies of gasoline."

Tuberculosis is an even more important creative factor than alcohol. The life of the tuberculous patient is shortened physically, but quickened psychically in a ratio inversely as the shortening. And here the list of tuberculous geniuses is an enormously long one. Schiller, Keats, R. L. Stevenson exemplify the states of depression of the consumptive: Molière, Nelson, Chopin its moods of buoyancy. "Men of common clay are but 'the pans and the barrows of the porters of the fire'; our tuberculous geniuses 'are children of the fire itself, made of it, and only the same divinity transmitted, and at two or three removes.'" There follow illustrative chapters which deal with the records at large, and the list is an impressive one; St. Francis of Assisi, Voltaire, Rousseau, Madame de Stael, Balzac, Kant, Goethe, Milton, Samuel Butler, Pope, Sterne, Jane Austen, Southey, Shelley, de Quincey, Ruskin, Francis Thompson, Synge, Washington Irving, Emerson—the list might be continued almost indefinitely. Sidney Lanier, the greatest American lyric poet since Poe, produced nothing of real value until in an advanced stage of pulmonary consumption, when his genius soared and he wrote his finest work.

The author's nationality being what it so obviously is, Dean Swift gets a chapter to himself. It is usually held that he was insane, but the theory that genius and insanity are the same breaks down at every point; if it were true we should seek for our finest creative geniuses in our mental hospitals. The genius is usually, if not always, of insane temperament, but his creative work reflects the man at his best, that is to say, sunset. Insanity is the Nemesis of the delicately balanced genius, never his good angel. Swift was a pronounced neurasthenic; and the stimulus to his finest work was "the woes of Ireland."

Still a third factor in the crucible of genius is the mixture in parentage of different racial elements, and geniuses are often hybrids. Woodrow Wilson puzzled the great American nation, but he would have puzzled no Scot. If you mix Hottentot and Hollander, the progeny will be queer, but it may throw up a genius, since a multiplicity of subconscious personalities will result. Lord Brougham in his memoirs states that he was saved from obscurity by the fact that his father, in place of marrying mere ordinary Saxon blood, went North for his Celtic, Scottish bride. "The genius tends to be the product of mixed ethnic and nervously peculiar stock—stock so peculiar that it exhibits an unusual amount of badness. The human family pays dearly for its geniuses. Just as nature in general is prodigal in wasting individuals for the development of a type, so do we here find much human wastage apparently for a similar purpose." Genius, in fact, is the lily on the dunghill; the race does benefit in the long run, but at great cost, the cost being in terms of degeneracy. And again the list of geniuses which rose from such an origin is a long one; the elder Dumas was half negro; Mark Twain had Dutch, English and Irish blood; Lafcadio Hearn, a son of Greece and of Ireland, could live in a negro quarter in the Southern United States, marry a Japanese wife, and write divinely well. Poe—one of the most dual personalities who ever lived—was of Irish, Scottish and English blood. Ibsen, Nietzche, Hilaire Belloc and Havelock Ellis are other examples. William Sharp ("Fiona Macleod") was of mixed Scandinavian and Celtic origin. "All of which may mean, not a practical joke of the gods, as Bernard Shaw sees it, but very good intentions on their part."

We have perhaps quoted sufficiently from Dr. Jacobson's fascinating book to show its main purport. It is a book to make the prohibitionist weep, and the eugenist swear. Vagabondage, sexual depravity, eccentricity are others of the characteristics of genius upon which the author dwells. Bernard Shaw "runs a purely imaginative laundry in which all the soiled linen of the world is cleverly washed."..... "Metchnikoff alternated between attempts to commit suicide and to find the means of prolonging life indefinitely."..... "Though the personal and literary sins of the creative artist be as

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scarlet, yet must he be forgiven seventy times seven if a masterpiece be created by him. It is this doctrine of atonement which makes thoughtful persons fear censorship so profoundly and tolerate derelictions so patiently. .....The greatest need of the genius, after all, is to be let alone. When 'discovered' he should be accepted as a legitimate social unit, though 'different' and seemingly dangerous."

Dr. Jacobson's book is eminently readable. Yet is he right? Could not far longer lists of geniuses who came from healthy stock be made out? From a scientific point of view, where are the 'controls' to his experimental findings? And what of the general multitude of non-geniuses? Perhaps the cleverest satirist of the bourgeoisie of to-day is Arnold Bennett, and if we are to believe his books the run of ordinary individuals tends to be just as alcoholic, as tuberculous, and as immoral as the genius. The "James Soames"—es of the world are not among its geniuses, nor among its criminals; yet—if we are to believe Arnold Bennett—when the veil is lifted from their secret lives, the result would almost warrant placing them among the degenerates. Fascinating as Dr. Jacobson's book is, we doubt its value as a scientific work.

DR. A. MITRA, M.B.: A SKETCH OF HIS LIFE AND CAREER.—By Pandit Anand Koul. Srinagar: The Kashmir Mercantile Printing Press, 1926. Pp. 10.

EVERY young Bengali should read the little sketch of the life of Dr. A. Mitra written by Pandit Anand Koul and published by the Kashmir Mercantile Press, Srinagar.

Ashutosh Mitra was born in Calcutta in 1895, and from childhood he showed evidence of outstanding ability and personality. After taking the degree of M.B. of the Calcutta University, he went to England for two years of post-graduate study, taking the diplomas of L.R.C.P. and L.R.C.S. of Edinburgh. On his return to India, he leapt into success as a private practitioner. In 1885, he was selected by the late Maharaja Sir Pratap Singh as Chief Medical Officer of Kashmir and the rest of his life was devoted to the service of that State. In spite of the pressing claims of professional and administrative work he found time to make contributions to the literature of medicine, for instance a paper on nerve stretching in the treatment of leprosy, and a booklet on plague.

His success as a medical administrator resulted in ever increasing burdens being placed on his shoulders, and no less than nine departments were entrusted to him, namely, Jails, Municipality, Education, the Chemical Laboratory, Zoological Gardens, Sanitation, Meteorology, Museum, and Public Library. All of these departments were thoroughly reorganised and ably controlled by Dr. Mitra.

His personal courage was illustrated when he was called on to quell a riot in the jail after all the guards had fled before the mutineers. In this he received a wound on the head, but showed a resolute front to the rebels. Again in the terrible cholera epidemics of 1888 and 1892 he worked with almost superhuman energy. When plague broke out in 1902 he showed similar resolution and adopted drastic measures to stay the pestilence.

He was responsible for the introduction of a proper water-supply to Srinagar, and for the saving of thousands of lives by this and other measures of sanitation. His one great pleasure was work; play and social distractions made no appeal to him, his words were few and well chosen except when he was engaged in the missionary work of instructing the people in matters of health. His one great fault was that he had no mercy on his own body and his illness was largely due to his forgetfulness of his own physical welfare.

A great administrator, he had no use for party politics, and succeeded in maintaining the friendship and respect of all the opposing parties in the State. A born leader of men, he had the great quality of getting from his subordinates the best work of which they were capable.

By dint of merit he rose to the high position of Minister of the Kashmir State, controlling all the departments which came under his charge as Chief Medical Officer.

He busied himself with everything that was in the interest of the State, with other matters he did not concern himself, so that when the hand of death was laid on him the whole of Kashmir was plunged into deep mourning and paid him a remarkable tribute of respect.

His devoted widow, Mrs. M. Mitra, happily still lives; she also is imbued with the spirit of love for humanity, and in memory of her revered husband she has founded a Research Scholarship in Diabetes, the disease from which Dr. Mitra died. This scholarship is tenable by an Indian at the Calcutta School of Tropical Medicine, and the present holder—Dr. J. P. Bose—has made a number of valuable contributions to our knowledge of diabetes as it affects the people of India.

The life and work of Dr. Mitra should be prominently kept before the young men of Bengal as an example of what can be done if only duty to humanity is kept before them as their guiding star.

It would be well that this account of the life and work of Dr. Mitra should be a textbook in every school in India.

HANDBOOK OF MEDICAL ELECTRICITY AND RADIOLOGY.—By James R. Riddell, F.R.F.P.S. Edinburgh: E. & S. Livingstone, 1926. Pp. 239, with 110 illustrations. Price, Rs. 6-6 net. Obtainable from Messrs. Butterworth & Co. (India), Ltd., Calcutta.

WRITTEN for the student, this little book should prove a real boon. It is designed to present to him as briefly as possible a survey of those physical agents employed in the practice of medicine and usually found grouped together in the electrical department of a general hospital. The subjects dealt with include electricity, x-rays, radium, light, and carbon dioxide snow. The information given is thoroughly up to date. For instance paragraphs are devoted to such advanced methods as the examination of the lungs by means of lipiodol injections, and that of the gall-bladder by the tetraiodophenolphthalein method.

Of very moderate compass, this little book is packed with reliable information on the subjects dealt with, and should prove of value, not only to the student of medicine but also to the general practitioner, to both of whom it is highly commended.

THE OPHTHALMIC YEAR BOOK, VOL. XXII. 1926. —Edited by William H. Crisp. Chicago: Ophthalmic Publishing Company, 1926. Pp. 315, with 9 illustrations.

THIS excellent annual continues to supply a most valuable digest of the literature on this subject during the past year, and is invaluable in giving references and short abstracts, classified carefully and very easy to look up. This volume is well up to the standard of its predecessors.

OPHTHALMIC SURGERY AND SIGHT TESTING.—By M. A. Kamath, M.B. & C.M. Mangalore: Sadananda Co-operative Printing Works, Ltd. Pp. xi plus 150.

THIS small book is an extension of *Notes on Ophthalmology* by the same author, and is very much on the lines of the *Aids* series, while purporting to represent the teachings of the Madras Eye Hospital. It covers a great deal of ground, is very compressed and will probably be found useful by those who have been well grounded in the subject in hospital, reminding them briefly of work done, but the want of explanations or

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The cultures were incubated for 24 hours at 37·5°c.

Results:

Plate No. 1 A.—1 c.c. filtrate - - No growth.
,, B.—1 c.c. 1 : 100 filtrate ,,
,, C.—1 c.c. 1 : 1000 filtrate ,,

Plate No. 2 A.—1 c.c. filtrate - - No growth.
,, B.—1 c.c. 1 : 100 filtrate ,,
,, C.—1 c.c. 1 : 1000 filtrate ,,

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pathological notes will prevent its taking the place of any of the well known textbooks, while many of its statements on treatment are open to criticism.

Annual Reports.

ANNUAL PUBLIC HEALTH REPORT OF THE PROVINCE OF BIHAR AND ORISSA FOR THE YEAR 1925. BY MAJOR J. A. S. PHILLIPS, D.P.H., I.M.S., OFFICIATING DIRECTOR OF PUBLIC HEALTH, BIHAR AND ORISSA. PATNA, SUPERINTENDENT, GOVERNMENT PRESS. PRICE RS. 2-3-0.

LT.-COL. W. C. ROSS, I.M.S., was in charge of the department throughout the year, assisted by three Assistant Directors of Public Health and a temporary staff. The consolidation of the temporary establishment of the department into a permanent cadre directly under the Director of Public Health in order to increase its efficiency was effected after the close of the year.

General Conditions affecting Public Health.—The rainfall for the year was below normal in Bihar and Chota Nagpur, and above normal in Orissa. In July heavy rains caused floods in Orissa, and the rainfall was much above normal in October and December.

Vital Statistics.—The population of the province was returned by the census of 1921 as 34,002,189, exclusive of the Orissa States. This figure has been adopted in making the calculations in the report.

The birth-rate for the whole province was 35.6, as compared with 35.7 in 1924 and 37.0 in 1923. The general birth-rate for the towns was 32.5, against 32.9 in 1924 and 31.5 in 1923. The death-rate for the year was 23.7 for the province, against 29.2 in 1924 and 25.0 in 1923. The highest death-rates were those in Cuttack, Puri, and Balasore, and were due to widespread epidemics of small-pox and malaria of a severe type. The excess of births over deaths was therefore 11.9, as compared with 6.6 in the previous year. There was a slight decline in the birth-rate for the province and a marked decline in the death-rate, which is satisfactory.

The Director of Public Health has again pointed out that the low death-rates returned by the Dhanbad and Chakradharpur municipalities and the districts of Singhbhum and the Santal Parganas can only be explained by defective registration. In municipal towns 314 omissions in the registration of vital occurrences were detected by health officers and officers of the Vaccination Department from the 26,782 occurrences reported. In rural areas, however, verification work is negligible.

Epidemic Diseases. Cholera.—The total number of deaths from cholera was 17,336, which is 60,144 less than the figure recorded for 1924. This accounts for the marked decline in the provincial death-rate from cholera from 2.2 in the previous year to 0.5 in 1925. The highest death-rate (4.0) was recorded in the district of Purnea, the highest rate amongst towns being in Katihar (3.6), Forbesganj (3.4) and Buxar (2.6). There was an outbreak of cholera in the town of Bhagalpur. The measures adopted by the municipality for checking it were ineffective, and it was through the unsparing efforts of Lt.-Col. Cook, the Civil Surgeon, and a voluntary staff that the disease was brought under control. The assistant surgeons on the epidemic cadre were employed throughout the province in connection with outbreaks of plague, small-pox and malaria, at the Sonepur *mela* for propaganda work and at other times on investigation of disease. A special epidemic reserve of 100 vaccinators was also maintained for six months for cholera and other epidemic duty.

During the year vaccinators and kavirajes were trained in disinfection and in simple measures for the prevention of disease in order that their services might be immediately available in rural areas for the initiation of measures against epidemics. The distribution of Government's stocks of vaccine and of remedies for cholera, etc., continued to be made through the agency of Civil Surgeons. The adoption of kaolin as a household remedy for cholera was finally made during the year when its many advantages were fully recognized.

Small-pox.—The death-rate from small-pox was 0.4, against 0.2 in 1924, the increase being due to a serious epidemic in Orissa. The highest mortality was recorded in the district of Puri (3.8), Cuttack (1.7) and Balasore (0.8). The Director of Public Health has observed that secondary vaccination, which is the only means of prevention, should be made compulsory and free. He also considers that the Vaccination Act should be amended in order to raise the age for compulsory vaccination from six months to one year. Operations can now be performed throughout the province by trained vaccinators with pure vaccine.

Fevers.—The mortality from fevers fell from 19.3 in 1924 to 16.4 in 1925. The Director of Public Health has pointed out that in order to avoid the inconvenience of disinfection, vaccination, etc., certain infectious diseases are returned as fever at the beginning of an epidemic. This suppression of the real facts is most dangerous as it helps the spread of the disease. Government hope that the health officers of Government and of local bodies, during their tours in villages, will bring home to the people the evil consequences of such a course.

The sale of quinine treatments rose from 671.2 pounds of quinine sulphate in 1924 to 726.4 pounds in 1925. 1,090 lbs. of cinchona febrifuge was distributed free in Puri, Cuttack and Balasore where malaria was prevalent in an epidemic form.

Plague.—The mortality from plague showed a decline from 0.3 in the previous year to 0.2 in 1925, the decennial average being 0.7. It is satisfactory to note that the figures for 1925 are the lowest on record since 1905. For the last five years, however, plague has been levying a heavy toll in the town of Darbhanga. The visitation is ascribed to the breakdown of the conservancy and sanitary services of the municipality which thus has the remedy in its own hands. By proper sanitary precautions plague is preventable and the municipal commissioners must therefore be held responsible for its appearance at Darbhanga. For the province as a whole, however, the continued decline in the mortality from plague is gratifying.

Expenditure on Sanitation.—

(*i*) *Municipalities.*—The expenditure for sanitary purposes showed marked improvement under drainage, the figures being Rs. 2,04,703 in 1924–25 against Rs. 97,590 in the previous year. There was an increase in expenditure under conservancy also, the figures being Rs. 10,25,314 against Rs. 9,57,423 in 1924.

(*ii*) *District Boards.*—The most noticeable increase in the expenditure of district boards for sanitation was under water-supply, conservancy and epidemics, the figures being Rs. 2,05,890, Rs. 2,27,916 and Rs. 84,063 in 1924–25, against Rs. 1,65,102, Rs. 1,97,037 and Rs. 31,739 in the previous year. The proportion of sanitary expenditure to total receipts increased in municipalities and district boards as shown below:—

	1925.	1924.
Municipalities ..	33.4	31.5
District boards ..	3.1	2.6

The scheme of public health organization for district boards is at present working only in five districts. Government had previously prepared for the guidance of district boards a model scheme of a public health organization and had offered to meet half the cost of its adoption up to a limit of Rs. 10,000 in each district.

They have now prescribed the qualifications required of health officers whose appointment is a statutory obligation on district boards unless exempted therefrom. It is unsatisfactory to have to note that the adoption of a public health scheme is delayed in several districts by the board's anxiety to appoint unqualified or otherwise

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incompetent health officers, or by their seeking sanction for alternative and usually impractical schemes devised by laymen without expert assistance. It is essential that the schemes in other districts should be introduced as early as possible, as it is on efficient district organisations that the general improvement of public health throughout the province depends. The Government Public Health organization can only be expected to supplement the efforts of local bodies in introducing sanitary measures and in combating epidemics after they have actually broken out.

Analysis of Food Samples.—A high percentage of adulteration continues as will be seen from the results of the examination of food samples given below:—

Ghee, 43 per cent. of samples analysed.
Atta, 92 per cent. of samples analysed.
Milk, 65 per cent. of samples analysed.

The adulteration of milk is especially noticeable as only 47 per cent. of samples were found impure last year. The Director of Public Health considers it very necessary that systematic action should be taken by local bodies under the Food Adulteration Act.

Work of the Medical Branch.—47 municipalities, 42 village unions and 33 high schools were inspected during the year under review. Lectures and addresses were delivered by touring officers of the Public Health Department and leaflets were freely distributed.

Seven municipal health officers continued to work as in last year, but their services terminated at the close of the year in four municipalities, as Government in view of their commitments to district board public health organisations were unwilling to continue to meet the salaries of municipal health officers. None of the municipalities so benefited has attempted to raise funds to maintain its own health officers, though most are conscious of the benefits thus derivable. The school medical officers visited 239 schools during the year, examined 12,222 pupils and delivered 1,313 lectures. About 7,000 leaflets, pamphlets, etc., were circulated through various agencies, including co-operative societies. The work serves a useful educative purpose.

During the year 1,200 items were examined in the sanitary laboratory, as compared with 988 in 1924. The Director of Public Health records a further advance in the bacteriophage research in connection with cholera which was continued in 1925.

The Director of Public Health and the Assistant Director of Public Health visited the Jharia mining settlements several times during the year and steady progress has been maintained in their work by the Jharia Mines Board of Health.

ADMINISTRATION REPORT OF THE MUNICIPAL COMMISSIONER FOR THE CITY OF BOMBAY FOR THE YEAR 1925–26. VOL. II. ANNUAL REPORT OF THE EXECUTIVE HEALTH OFFICER FOR 1925. BOMBAY. PRINTED AT THE *TIMES OF INDIA* PRESS. 1926.

Area and Population.—The area of the city is 23.54 square miles and the estimated population in the middle of the year 1925 was 1,259,414; on this estimated population the birth-rates and death-rates in this report have been calculated.

Births and Birth-rates.—Excluding 1,716 still-born children, the number of births registered during the year was 20,268 and was less by 1,570 than in 1924 and by 481 than the annual mean number of births registered in the ten years, 1915–1924.

The birth-rate calculated on the estimated population for 1925 was equivalent to 16.1 births per 1,000. Calculated on the census population for 1921, the birth-rate was 17.2.

As a check on the work of the staff engaged in the registration of births, the death certificate of every child dying under the age of 12 months is endorsed with the number of its birth certificate if the birth has been registered, and if not is marked "unregistered."

Deaths and Death-rates.—The total number of deaths registered from all causes during the year was 31,968, being 6,806 less than in 1924. It was 10,728 less than the average annual mortality of 1920–1924 and 10,844 less than the average annual mortality of the preceding ten years, 1915–1924.

Infantile Mortality.—Of the total deaths among infants, 1,553 or 22 per cent. took place in the first week of life and 967 or 13 per cent. in the age-period 1 to 4 weeks.

The mortality among infants who had not completed the first month of life was thus 2,520 or 35 per cent. of the total infant deaths. The number of deaths in the age-groups 1 to 6 months and 6 to 12 months was 2,199 and 2,573, being respectively 29 and 36 per cent. of the total infant mortality.

Summary of Work in connection with reduction of Infantile Mortality.—During the year the municipal nurses paid 45,452 visits to houses, chawls and huts (against 54,543 in 1924), enquired into 3,695 cases of ordinary sickness, and reported 288 cases of infectious diseases and 596 deaths in the female population of the city. They also attended on 1,455 confinements (against 1,842 in 1924) and verified the reports of the *birth karkuns* on 5,426 births. Of the women confined 1,868 were primiparæ.

Of the total number of 21,984 births (including 1,716 still-births) registered in the city during the year, 9,961 or 45 per cent. were verified by the municipal nurses as against 53 per cent. in 1924 and 63 per cent. in 1923.

Among the cases wherein enquiries were made, the proportion of births wholly unattended was 6 per cent. and that of confinements attended by unskilled women 44 as against 6 and 51 respectively in 1924.

Plague.—Plague did not assume epidemic proportions at any time during the year. The number of plague attacks was 192 against 450 in 1924. The disease caused 174 deaths in the year as against 409 in 1924 and 786, the average for 1915–1924. The mortality among reported cases was 90 per cent. as in the previous year. The number of deaths from plague was the lowest since 1896.

Plague Measures.—The usual preventive and precautionary measures such as, (*i*) inoculation, (*ii*) rat destruction, (*iii*) evacuation and (*iv*) disinfection were continued during the year: 5,850 persons were inoculated; 642,405 rats were destroyed, of these 315,185 were examined and 2,319 were found to be infected.

Small-pox.—Small-pox was prevalent in the city throughout the year and caused 570 deaths against 1,242 in 1924 and 594, the average for the preceding ten years (1915–1924). The number of attacks from small-pox registered during the year was 975 (including 23 imported cases) against 2,097 attacks in 1924.

Vaccination.—There are 19 vaccination stations in the city. The total number of primary vaccinations and of re-vaccinations performed during the year was 20,400 and 15,220 respectively, as against 20,135 and 26,508 in 1924.

The proportion of primary vaccination (13,544) in children under one year of age to the total number of births (20,268) registered during the year was 67 per cent.

Cholera.—There were 18 attacks and 12 deaths from cholera during the year as against 57 attacks and 34 deaths in 1924. Of the total number of cases 2 were imported.

Influenza.—The number of deaths registered as due to influenza during the year was 94. Diseases of the respiratory system to which deaths from influenza are frequently attributed were registered as the cause of death in 12,151 cases as against 118 and 14,410, respectively, in 1924. The number of deaths (94) from influenza in 1925 was 684 less than the average of the last five years (1920–1924).

Tuberculosis.—The number of deaths from tuberculosis was 1,404 and the dath-rate 1.11 per 1,000 of the population. Of these, 1,202 were due to pulmonary tuberculosis and 202 to other tuberculous diseases. There were 745 deaths among males and 659 among females. The disease caused a greater number of deaths

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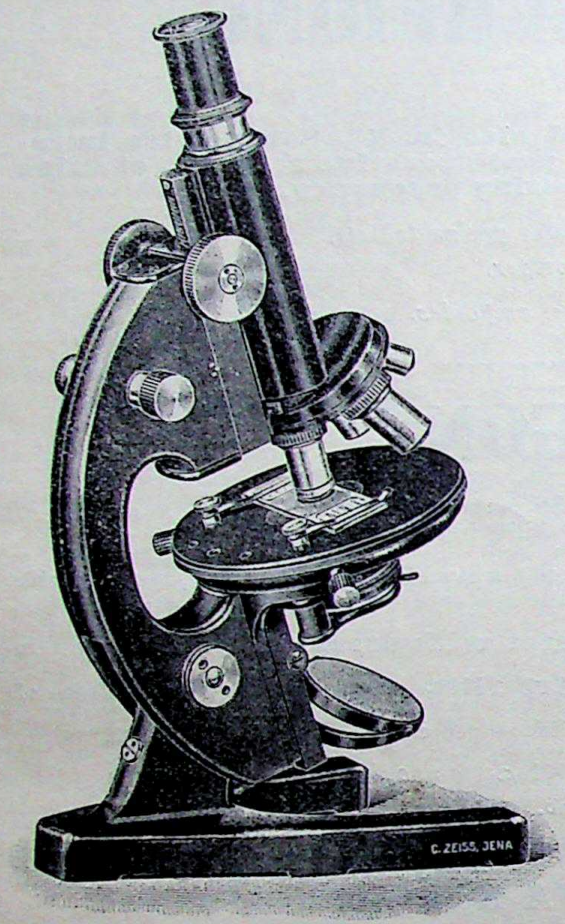

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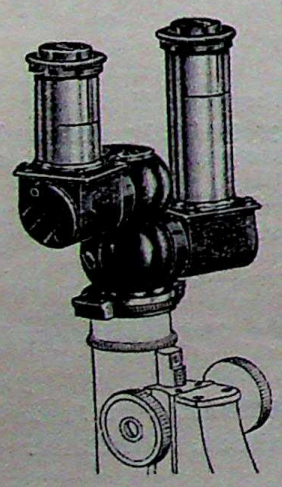

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among persons in the age-group of 20 to 40 years than in any other age period.

Anti-tuberculosis Measures.—There are two dispensaries for out-patients suffering from tuberculosis. Each dispensary is in charge of a medical officer and three nurses are employed for visiting the patients who attend, reporting on their house conditions and seeing that they follow in their homes the advice which they receive.

During the year under report the total number of tuberculous patients treated at the two dispensaries was 1,327; the number treated in 1924 was 1,302. The medical officers paid 2,661 domiciliary visits to see patients too ill to attend the dispensary.

During the year, 133 new patients were admitted to the sanatorium and 25 remained over from the previous year. Of these 38 were discharged improved or much improved; 72 were discharged at their own request; 28 died and 20 were under treatment at the end of the year.

Malaria.—Malaria was registered as the cause of 581 deaths, whilst 2,237 deaths were registered as due to ague and remittent fevers. Under the last two heads a number of deaths are no doubt included which were due not to malaria but to one or the other of the various diseases such as typhoid, tuberculosis and influenza in which fever may be a prominent symptom.

Anti-Malarial Measures.—Measures for gauging the incidence of malaria were continued during the year.

Spleen Rate.—The spleen rate for the whole city was 7.60 per cent. against 8.13 in 1924 and 7.80 in 1922.

Parasite Rate.—Out of 1,146 slides examined 37 showed parasites.

Quinine and Cinchona.—153 lbs. of quinine and cinchona febrifuge were supplied to patients and others free of charge through the 12 municipal dispensaries and other municipal agencies and at the municipal maternity and infectious diseases hospitals.

Wells.—Of the total 3,884 wells in the locality, 71 were filled in and 57 were covered during the year. 2,211 wells were examined for larvæ and in 318 of these larvæ were found.

Back Bay Reclamation.—Reclamation of the area in Colaba was in hand and the dredger was working up to the middle of May. It again commenced to work in November. The Medical Officer of the Development Department is looking after this area and treating the pools and puddles with crude oil. Larvæ of Anopheles mosquitoes were found to breed in these pools but they were not allowed to reach maturity as they were killed by the oil. A spleen census and an examination of the blood of the children in the labourers' camp in Colaba were carried out in 1925 by the special medical officer; 75 children were examined, two had enlarged spleens and two had parasites in their blood.

Venereal Diseases.—The number of deaths ascribed to venereal diseases during the year was 41 against 45 in 1924. Of the 41 deaths 39 were due to syphilis.

League for Combating Venereal Diseases.—Early in the year 1918, a League for Combating Venereal Diseases was established in Bombay under voluntary management, with the Head Office, Information Bureau and an Outdoor Dispensary at No. 66, Lamington Road. The management has been taken over by the Bombay Municipality from the 1st April, 1925. At the Information Bureau information and advice are given to the public and educational literature in English and the vernaculars is distributed. The dispensary is well equipped with all the necessaries for the three diagnosis and treatment of venereal diseases by modern methods. The staff of the dispensary consists of a medical officer-in-charge, a lady physician, a nurse and dispensary and laboratory assistants.

During the year ending 31st January, 1926, the number of patients registered in the dispensary was 2,284—1,744 males and 540 females. The average daily attendance of patients was as follows:—

Males.		Females.		
New.	Old.	New.	Old.	Total.
7	56	2	32	97

During the year under report 707 injections of neo-salvarsan were given and 341 Wassermann tests were made, besides a very large number of other injections and tests.

Sanitary State of the City.—The principal causes of the insanitary conditions which maintain the death-rate at a high level even in non-epidemic periods are the insufficiency of the water supply, the insufficiency of the sewers, the continuance of the basket privy system of conservancy, the density of houses and persons per acre and overcrowding of persons in rooms and tenements.

Water Supply.—The quantity of water available throughout the year has been well above the average, but the supply is intermittent and the pressure insufficient in many cases to fill the storage cisterns on the roofs of high buildings. Serious nuisance thus arises through the failure of the supply to the flushing tanks of water-closets.

Drainage.—Reference was made in some detail in the report for 1920 to the gravity of the insanitary conditions which result from the inadequacy of the present sewer system and the continuance of the old insanitary basket privies. The scheme for remodelling and enlarging the whole system is still under consideration and no progress has been made except in the construction of new sewers to be used when the location of the outfall has been decided upon.

Insanitary Dwellings.—The routine inspection of dwellings and premises presenting or likely to present sanitary defects has been systematised under a scheme whereby each one of the 50 medical assistants and 20 medical inspectors is required to devote not less than two afternoons a week to the inspection of houses in streets or areas definitely allotted for the purpose by the assistant health officers. The scheme aims at the inspection of not less than 10 houses per week by each member of the inspectorial staff or 35,000 houses in all in the year. Were inspection the single object in view, these numbers could be doubled or trebled. Since however the primary inspections are only the first step in securing the remedy of the sanitary defects discovered, their number is strictly limited by the number of secondary visits which the enforcement of the requirements of the department entails.

Six hundred and eighty-five insanitary dwellings were evacuated during the year, the great majority being insanitary kutcha huts.

REPORT OF THE BURMA PASTEUR INSTITUTE AND BACTERIOLOGICAL LABORATORY, RANGOON, FOR THE YEAR ENDING 31ST MARCH, 1926. BY LIEUT.-COL. J. TAYLOR, D.S.O., M.D., D.P.H., I.M.S., DIRECTOR. RANGOON, SUPDT., GOVT. PRINTING.

As far as one can gather from this report, Burma has not yet commenced the general issue of antirabic vaccine to out-stations. The result is a steady rise in the total number of patients treated at the Institute from 643 in 1924–25 to 1,092 in 1925–26, an increase of 40 per cent. in a year. In addition to this 692 persons were advised that treatment was unnecessary. This very high figure shows that the Burma Institute is careful to exclude most patients who are not at risk—a practice which it is desirable that other Institutes should follow.

Of 145 patients who voluntarily abandoned treatment no less than 125 were from Rangoon City, mostly labourers and menials. The practice of giving a bonus of Re. 1 to labourers and menials employed under the Rangoon Corporation who complete the course of treatment has not proved successful, and was abandoned towards the end of the year. Instead it has been decided that in the case of any employee of the Corporation or of any private firm coming for treatment, the employer should be asked to give a full day's pay for the half day's work of a person certified to be attending daily for treatment. This will mean that the individual under treatment will be at no financial loss.

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Three deaths were reported among the 901 patients who underwent a full course of treatment, a death-rate of 0.33 per cent. Of these two only were failures of treatment, giving a failure rate of 0.22 per cent. Two of the deaths occurred among patients bitten on the head and Colonel Taylor, in a special table, emphasises the special danger of bites on the head. For the total figures for the years 1920–26 the death-rate amongst those bitten on the head was 6.3 per cent., in those bitten on bare skin on the trunk and extremities 0.51 per cent., and in those bitten through clothing 0.3 per cent. In other words, although bites on the head constitute only 3 per cent. of the patients treated, they are twelve times as dangerous as bites elsewhere on the body.

The usual statistical tables are appended to the report, and show certain features of antirabic work in Burma. Only 36 per cent. of the patients came from outside Rangoon: the monthly distribution in number of patients did not show any marked fluctuations; of 901 persons who received the full course of treatment, in only 18.8 per cent. was it proved that the biting animal was rabid by laboratory tests: no jackal bites occurred during the year: and reports were received on the health of 772 out of 835 persons treated. Of 138 brains sent for examination, 27 were in a condition unfit for examination—a testimony to the carelessness which prevails with regard to this important matter; every Director of a Pasteur Institute in India is familiar with the long succession of decomposed brains, decomposed dog's bodies, etc., which arrive for examination, and a good working rule is to have all such parcels opened *outside* the laboratory. The fixed virus was in its 535th passage on the 31st March, 1926.

Turning to the Bacteriological Section, a total of 4,551 routine examinations was called for during the year, and 210 autogenous vaccines were prepared. The Institute now stocks and supplies curative sera, and by storing in bulk it has been found possible to reduce the price of such sera. Cholera and influenza vaccines were issued on behalf of the Director of Public Health, and 387 samples of calf lymph from the Vaccine Depôt, Meiktila, bacteriologically examined. A pamphlet giving the methods of collecting and sending laboratory specimens was issued to all civil hospitals and private practitioners in the Province.

Research work was steadily continued during the year. An investigation into the keeping properties of carbolised antirabic vaccine shows that such vaccine will remain potent for two to three months, whether stored in the refrigerator or at room temperature. An enquiry is being conducted into the possible existence of schistosomiasis in Upper Burma, under a grant from the Indian Research Fund Association; whilst a second enquiry into beriberi in Burma is also being carried out under a similar grant. Special treatments have been instituted in the leper asylums of Burma under the supervision of the Institute, and 51,600 c.c. of hydnocarpus oil and creosote were issued during the year. The asylums were visited, and the results of treatment studied. Five lepers were treated at the Institute during the year and 341 injections given; the preparation was found to be non-irritant and was well borne; all five cases showed distinct improvement, and one apparent cure. Special research work was also carried on into methods of investigation of water samples.

In the covering note to the report Colonel A. Fenton, I.M.S., Inspector-General of Civil Hospitals, Burma, notes that as the result of the investigation into the keeping properties of the carbolised antirabic vaccine at atmospheric temperatures, it will now be possible to issue the vaccine, and that proposals will shortly be submitted for the establishment of out-centres for such treatment.

Lieut.-Col. J. Taylor, D.S.O., M.D., D.P.H., I.M.S., was in charge as Director during the year; Major C. de C. Martin, M.B., I.M.S., was Assistant Director; and Military Assistant Surgeons G. H. Blaker, I.M.D. and J. A. d'Costa, I.M.D., were Assistants to the Director during the year.

PASTEUR INSTITUTE OF SOUTHERN INDIA, COONOOR. ANNUAL REPORT FOR THE YEAR 1925–26. BY LT.-COL. T. H. GLOSTER, M.B., D.P.H., ACTING DIRECTOR. MADRAS, SUPDT., GOVT. PRINTING.

THE results of the policy of issuing antirabic vaccine to hospitals and dispensaries in the Madras Presidency, in place of making all patients go to Coonoor, is shewn in the following remarkable figures:—

Year.	Total number of Patients treated.	
1920–21	3,623	
1921–22	3,471	
1922–23	3,375	
1923–24	1,354	(first outside issue of vaccine)
1924–25	489	
1925–26	572	

whilst, out of the last total of 572 patients, no less than 335 came from Coimbatore district. Advice cases in the year numbered 155, and the virus was in its 973rd passage on February 28th, 1926.

On the other hand no less than 4,072 persons received treatment at local centres with vaccine issued from Coonoor. The total death-rates for (*a*) those treated at the Institute, and (*b*) those treated at local centres were respectively 1.04 per cent. and 0.61 per cent.; and the corresponding failure rates 0.69 per cent. and 0.39 per cent. On the face of it, this would appear to show that better results are obtained by the use of vaccine at local centres than at the Institute, but this conclusion does not of course follow. It is well known that the larger the number of patients treated, the lower becomes the mortality, since with increase in numbers more and more persons who are at little risk come to be included, whilst it is probable that the more serious cases would tend to go to the Institute rather than to local centres for treatment. Complete information also is only available from 69 per cent. of those who received a full course of treatment at local centres. Some local centres, such as those at Tanjore, Trivandrum and Mangalore reported on nearly 100 per cent. of the patients treated three months later; others—such as those at Calicut, Ernakulam, and the Victoria Hospital, Bangalore—furnished very defective returns.

Registration of deaths from hydrophobia has been in force in the Madras Presidency since 1913, and the collected returns are of considerable interest. Between the years 1913 and 1921 the total number of deaths per annum fluctuated between the figures of 89 and 140; but in the year 1922, when the first general outside issue of antirabic vaccine took place, the number suddenly leapt up to 220, and in 1924 no less than 364 deaths from hydrophobia were reported. This is probably due to the increased attention paid to hydrophobia as the result of the issue of vaccine to out-stations. The excess of deaths registered from hydrophobia in the Province over the small number of deaths recorded amongst those treated shows that only a proportion of persons bitten by rabid animals come under treatment, even with the present extended facilities. Of the total deaths registered in the Province since 1913, only 269 were among treated persons, whilst 3,195 occurred among untreated persons. It is probable, therefore, that very considerable expansion of antirabic work in this country will be called for in the future. Colonel Gloster estimates that during the years 1913–1924 some 60,000 persons were bitten by rabid animals in Madras Presidency, but that only about 10,000 of them—a proportion of 1 in 6—received antirabic treatment.

Part III of the report contains the usual statistical information with regard to the patients treated at the Institute. Europeans and Anglo-Indians treated during the year numbered 28 as against 544 Indians; 427 out of the 572 patients treated arrived within ten days of having been bitten; the monthly distribution of patients is fairly uniform, and there is little evidence of any seasonal variation in rabies in India; 4 out of the 7 deaths which occurred are classified as failures of treatment, i.e., deaths occurring more than 15 days after the end of treatment; 527 out of 572 patients came from

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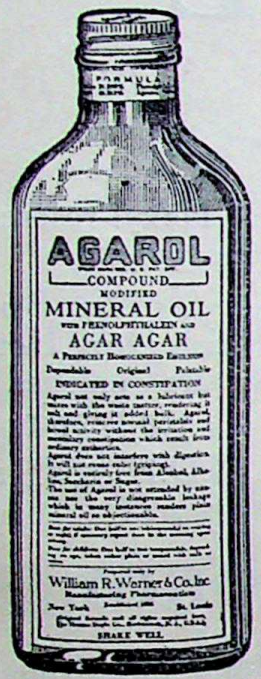

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the Madras Presidency; jackal bites numbered only 8 cases out of the 572—a very low percentage and in marked contrast to the figures for such institutes as that at Shillong; 24 out of 193 brains received for examination for Negri bodies were in a condition unfit for examination; whilst it is noted that almost all the District Boards and Municipalities in the Presidency have continued to pay their annual contribution to the Institute, in addition to paying for the vaccine issued from the institute to out-stations. Sales of antirabic vaccine realised the sum of Rs. 41,459; the total income during the year was Rs. 69,374, and the total expenditure Rs. 49,898.

Lieut.-Col. J. W. Cornwall, C.I.E., M.D., I.M.S., held the post of Director up till January 28th, 1926, when he proceeded on leave prior to retirement, and was succeeded by Lieut.-Col. T. H. Gloster, I.M.S.

Correspondence.

THE COUNTRY *DAI* AND HER MINISTRATIONS.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—I shall be much obliged if you will kindly allow me space in which to publish notes on the following two cases.

Case 1.—On the 28th Nov. 1926. I was called in to attend a labour case in the *mofussil*, about twelve miles from this town. On enquiry, I was told that the case was one of hand presentation and that labour had already lasted for two days. The man who called me wished me to bring a midwife with me, but I preferred to take the sub-assistant surgeon to help me.

When we arrived at the patient's house, the relatives did not wish us to attend the case, but after some two hours' discussion we were permitted to do so. The patient was lying in a small hut, with very little light, and dusk was drawing on. She was a multipara, the mother of six or seven previous children, and some 40 years of age. She appeared to be in sound health, but all labour pains had ceased since the previous night; the pulse was 91 per minute, and the temperature elevated. The bladder was distended and a catheter was passed and relieved this condition.

The labia were swollen, and on examination a piece of bone was found to be protruding from the vagina. On examination I found the case to be one of left handed presentation with the head on the right side. The hand of the fœtus had been torn off at the wrist. Foul smelling gas was escaping from the vagina.

Under chloroform anæsthesia I succeeded in carrying out internal version and in delivering the fœtus and placenta. The patient—to my surprise—made an uneventful recovery. The child, of course, was dead.

The special point about this case is that the untrained country *dai* who had attended the patient before I saw her had used sufficient violence to tear off the presenting hand, which she had concealed from everyone present. The amount of violence necessary to tear off a fœtal hand can easily be imagined.

Case 2.—On the 20th December 1926 I was called in to attend a labour case in a neighbour's house, and was told that the case was one of breech presentation. On reaching the house I found the *dai* still in attendance and pulling hard at the presenting parts. She informed me that she was doing her share of effort, but that the patient would not bear down sufficiently hard, as she had been directed to. On examination I found the fœtus with both elbows well jammed into the brim of the pelvis. I succeeded in bringing down the arms, but the chin rotated forwards and became fixed. The aftercoming head gave considerable difficulty, and after some time a well-developed but dead fœtus was delivered.

A live child could have been delivered in this case had it not been for the ministrations of the so-called "expert" *dai*.

How long is India going to put up with such barbaric midwifery?—Yours, etc.,

TARAK NATH CHAKRAVARTY, L.M.S.

NILPHAMARI,
11th February, 1927.

THE INDIAN SCIENCE CONGRESS.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—It was a matter of satisfaction to see the great interest shown by the Medical and Veterinary Section of the Indian Science Congress in the deliberations at Lahore last January, and more so because the number of papers sent exceeded all previous records. One may anticipate a similar increase in the next year's Congress.

Considering the time at disposal at any single session, to strike an average one gets 12 papers per day of 3 hours work, a time which is very unreasonable both to the author and to the large audience who attend, especially the younger of my age with a desire to pick up new ideas and newer work on older known things.

May I suggest that papers of prime importance involving original work or original ideas should be given a much longer time for the author to detail as much as he likes?

At Lahore it was observed that a great deal of the time was spent in a sort of popular talk about prevention, etc., thus leaving aside some very original papers, e.g., those by the President and Lieut.-Col. H. W. Acton, nearly unread or taken as read.

If it would not be presumptuous on my part, as I very keenly follow the medical and veterinary research work from year to year, I would make the following suggestions:—

The papers be grouped in distinct classes, as follows:

(*a*) Papers relating to original work or original ideas, e.g., the theory of acquired angiomata by Colonel Acton, "Vaccinia Virus" by Dr. Pandit, etc.

(*b*) Papers relating personal observations of scientific technique; e.g., the pharmacological work by Major Chopra, the production of a tumour by inoculation of *B. lepræ* by Dr. Muir, and the physiology of the coronary circulation by Prof. Cruickshank.

(*c*) Papers relating to the invention of instruments or apparatus of a purely physical or chemical nature, or papers relating to animal or plant life useful to medical science, e.g. "Fish in the control of mosquitoes" by Hora; an apparatus for recording the temperature of insects by Colonel Acton; a cold incubator, etc.

(*d*) Papers embodying personal observations of a controversial nature, new methods of treatment (the idea alone being narrated without details of clinical work), e.g., "Sanocrysin in the treatment of Tuberculosis" by Möller.

(*e*) A number of papers which the authors wish to be brought to the notice of the Congress to be allowed only if printed copies are supplied and to be taken as read.

Under the last heading will come all papers on tuberculosis, child welfare, statistics, etc.

In case there is a large number of members desirous of discussing one single subject, printed summaries being circulated one day previous, all the interested members can have a sectional meeting for discussion, specially on the day on which the presidential address is delivered, as this address is generally of general interest of wider scope.

If the papers are taken up in this order, the best material will get the greatest scope and will receive the honour hard and laborious work deserves. It was a pity that some of the best papers were dismissed in a very short time and an amount of time wasted over popular discussions which knew no end.

This is in no way meant as a criticism on the management of the Section, but is a humble suggestion from an eager listener, interested in scientific medicine.

An important idea was expressed by the President in his address about the establishment of a Central Research Institute in Pharmacology and is very inviting. With a view to setting out the strength of the Medical and Veterinary Research Section will it help to issue

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a questionnaire to the members asking them to give their names, qualifications, places of work, the persons under whom they were trained, the personnel under their training, the scope of their work, the subjects in which they are interested, and the source of funds for the work? This may be of use to some extent to see how far we are in need of such an organization as a large Central Research Institute for the country and what chance it has of being efficiently manned.—Yours, etc.,

P. V. GHARPURÉ.

GRANT MEDICAL COLLEGE, BOMBAY,
18*th January*, 1927.

NEURASTHENIA IN THE TROPICS.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—May I have your permission to endorse the hope of Major R. Knowles, I.M.S., that the very interesting paper on "Neurasthenia" read recently by Lieut.-Col. H. W. Acton, I.M.S., before the Medical Section of the Bengal Asiatic Society, will attain the intensive study and appreciation which it so richly deserves? As might only be expected of him, Colonel Acton has given his colleagues the world over a very illuminating study of neurasthenia, and that too in the sense of the disease which most neurologists nowadays take to be the correct one. Hence from the strictly neurological standpoint there is very little in the views of Colonel Acton as to the etiology and treatment of neurasthenia to which anyone could take serious objection, except and in so far as he makes the sexual factor a secondary and not, as I hold it to be, a primary one. In the discussion that followed Colonel Acton's paper, Colonel Green-Armytage shewed a strong appreciation of the importance of the sexual factor in the etiology of neurasthenia, but in that he cited "coitus interruptus" as a prominent feature in the causation of this neurosis, one is at liberty to presume that this eminent gynæcologist confuses neurasthenia with anxiety neurosis. On the other hand, Colonel Green-Armytage is, I think, perfectly correct in citing excessive masturbation, in women as well as in men, as a potent influence in the production of neurasthenia. From my own experience, as well as from much study of neurological literature, I have reached an almost unshakeable belief in the correctness of the Freudian theory that real neurasthenia arises solely through a conjunction of an excess of efferent stimulation with a serious defect in afferent stimulation. Further, all those subjective feelings of physical ill-being, to which Colonel Acton calls attention, especially those associated with the alimentary and excretory functions, arise secondarily from a repercussion of thwarted *libido* upon secondary erogenetic zones. In these circumstances, it should be obvious that the only prescription that can be of any real value to the patient, is a return to, or, as the case may be, an institution of, a normal *vita sexualis*.—Yours, etc.,

OWEN BERKELEY HILL, M.D. (Oxon.),
Lieut.-Col., I.M.S.

RANCHI EUROPEAN MENTAL HOSPITAL,
25*th January*, 1927.

QUININE-UREA INJECTIONS IN MALARIA.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—In continuation of my previous letters on this subject, my attention has been arrested by the following passage in Messrs. Parke Davis and Co.'s *Index of Materia Medica and Therapeutics*, 1927, at the foot of p. 107. "The combination of quinine and urea is said to be superior to any single quinine salt in malaria (*Brit. Med. Jour.*, Epitome, 1908. Vol. II, p. 91)."

Also a reference to Dr. Leo von Gordon's article in the *Schweizerische Medizinsche Wochenschrift* suggests that the double salt of calcium chloride and urea is useful in fevers; and—recollecting that the combination of antimony with urea has up to the present proved to be the best remedy in the treatment of kala-azar—it seems possible to me that the combination of quinine with urea may be found to be of definite value for injection in cases of malaria, as I previously suggested.—Yours, etc.,

J. E. LEONARD CHINAL, M.D.,
D.T.M. (Bengal).

MONGHYR,
13*th January*, 1927.

A CASE OF NASAL MYIASIS.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—The following notes on a case of nasal myiasis may be of interest to your readers.

Three years ago a male adult patient from a village near Baroda consulted me for intense pain in the head and a serous discharge from his nose. The pain was of an unbearable character, and the patient continuously tossed his head from side to side both day and night. On examining the nose an inflammatory condition of the mucosa was found, and whilst douching the nose the next day a maggot was detected in the discharge.

I immediately put the patient on to an alkaline nasal douche and turpentine drops. Maggots came out from both nares in bunches of 15 to 20 at a time, and in the course of three or four days he was much relieved. He was then advised to go home, but to continue the nasal douching and treatment.

Two weeks ago he returned to my dispensary with the same symptoms. I had no hesitation in making the diagnosis. He was again treated in the same manner, and has again made a (possibly temporary) recovery. It is difficult to say whether the second infection is a relapse of the former one, or a newly acquired one. Normally the patient is able to sneeze and to detect smells and odours. He is neither syphilitic, nor leprous.—Yours, etc.,

VENILAL N. MODI, M.B., B.S.

RAOPURA, BARODA STATE,
19*th January*, 1927.

(*Note*.—We believe such cases to be not uncommon, but would welcome information on the best lines of treatment. During the war in Mesopotamia in 1914–15, after the battles of Shaiba and Nasiriyeh, many of the Turkish and Arab wounded lay out in some instances for days before they were collected, and very many of them showed heavy myiasis infection of their wounds. In some instances, where wounds of the limbs were swarming with maggots, amputation was found necessary.—EDITOR, *I.M.G.*)

VACCINATION AND FEMALE EDUCATION.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—Government has posted vaccinators throughout India in order that small-pox may be eradicated from this country. Why, then, do epidemics of small-pox occur? This cold weather there has been a severe outbreak in this side of the Punjab, and in many villages the scenes witnessed have been almost unbearable, whole villages being infected, and the mortality rates high.

The reason is that the women of India are uneducated. On the arrival of a vaccinator in a village some mothers carry their children away immediately to another village in order that they may escape vaccination. Others, who cannot so escape, have their infants vaccinated and then immediately remove the lymph by sucking or by washing it off. These ignorant women do not believe in vaccination. The only method to save India from epidemic outbreaks of small-pox is to improve the state of affairs with regard to female education.

This *tahsil* is 64 miles long by 48 miles broad. The total expenditure in it on female education is Rs. 51 *per mensem*. With so trivial an expenditure on female education the mortality from small-pox and other epidemic diseases can never be diminished.—Yours, etc.,

RUDRA DUTT,
Assistant Surgeon.

MAILSI,
16*th January*, 1927.

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OBITUARY.

WE regret to record the death from heart failure on January 19th, 1927, of Sir Kailas Chandra Bose, one of the most distinguished medical men in India, and one of her greatest benefactors.

Kailas Chandra Bose was the second son of Babu Madhusudan Bose, a member of a famous Bose family of Simla, resident in Calcutta, and was born on the 26th December 1850. His father and the members of his family were the pioneers of steamship communication on the River Hughli, were well known in commercial circles, but also distinguished for their patronage of science and literature. After passing through school with considerable distinction, K. C. Bose entered the Calcutta Medical College, from which he graduated in the Calcutta University in 1874. At first he entered government service as Resident Medical Officer, Campbell Hospital, Calcutta, but was persuaded by a brother to leave government service and to set up as a private practitioner. Within two years he had secured in Calcutta a brilliant reputation, and had established a lucrative practice, especially among the Marwari community. It was not long before he was recognised as the leading Indian medical practitioner in Bengal.

He was President of the Calcutta Medical Society, Vice-President of the first Indian Medical Congress, a Commissioner of the Calcutta municipality in 1899, and was created a Rai Bahadur in 1895. In recognition of his valuable services to Bengal he was further created a Companion of the Order of the Indian Empire (C.I.E.) in 1900, and a Fellow of the Calcutta University from 1904 onwards. His public work was recognised by the award of the Kaiser-i-Hind gold medal in 1910, and in 1916 he was knighted, being the first Indian doctor to receive this honour. Amongst other honours which fell to him were the

The Late SIR KAILAS CHANDRA BOSE, *Kt.*, C.I.E., O.B.E.

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Order of the British Empire in 1918, membership of the Governing Body of the State Medical Faculty of Bengal, and the presidentship of the Antimalarial Co-operative Society. He was also an honorary presidency magistrate.

From first to last Sir Kailas' career was characterised by two special features, his great professional ability, and his intense philanthropic interest in the hospitals and charitable institutions of Calcutta city. The first brought him wealth, which he expended upon the second. He was a man of very great personal charm and force of character, an Indian of the old school who believed strongly in the British connection, and an idealist. In controversy he did not hesitate to tell the truth, however unpleasant, and his opinion was listened to and deferred to in a way that would not have been possible to anyone less an idealist and a seeker after truth. His convictions and his personal courage led him to brush aside the conventions of diplomacy and the unrealities of politics, in which he never mingled.

Among his innumerable philanthropic activities his collection of funds for the establishment of the Bengal Veterinary College and Hospital was a notable event. In addition he collected a sum of Rs. 36,000 for the erection of kennels and the provision of veterinary ambulances. The cottages for paying patients at the Calcutta Medical College Hospitals were constructed through his exertions, in which connection he raised a sum of nearly 1½ lakhs of rupees. A sum of Rs. 20,000 was contributed by one of his friends in recognition of his work to the Prince of Wales Hospital, Calcutta, for equipment for surgical work. He raised Rs. 12,000 for the endowment fund of the Lady Dufferin Hospital. Finally his most notable effort was his long and close personal association with Sir Leonard Rogers in arousing interest in the scheme for the Calcutta School of Tropical Medicine, and in collecting funds for its endowment. In effect, Sir Kailas Chandra Bose and Sir Leonard Rogers, after raising very considerable contributions for the scheme from the Indian community in Calcutta were in a position to go to the European commercial community, and point out the necessity for their also supporting the scheme. A sum of two and a half lakhs was raised by Sir Kailas for this project, and the School owes its inception not less to the efforts of Sir Kailas than to those of Sir Leonard Rogers. He gave personally a further sum of Rs. 5,000, and the Kailas Chandra Bose ward for Indian males in the Carmichael Hospital for Tropical Diseases was named after him.

Further philanthropic efforts on his part resulted in his raising a sum of Rs. 40,000 for a pilgrim rest house at Puri, and a further sum of Rs. 13,000 for a separate female ward in the Puri Pilgrim Hospital. Other endowments which he raised were for the supply of a pure drinking water-supply for pilgrims at Puri, and a sum of nearly half a lakh of rupees for the improvement of the leper colony at Puri. He also collected a sum of Rs. 65,000 and placed it at the disposal of the Government of Bengal for the construction of a zenana bathing ghat close to Howrah bridge; and further sums totalling Rs. 75,000 for the pilgrim rest house at Kalighat. Further exertions on his part resulted in raising a sum of Rs. 65,000 for opening the park and recreation grounds in Kidderpore, and a sum of Rs. 50,000 for a maternity home for Indian women, recently opened by H. E. the Governor of Bengal. There is hardly a hospital for man or beast or a philanthropic institution for the benefit of suffering humanity in Calcutta that does not owe him a debt of the deepest gratitude.

His activities were not confined however to philanthropic work. In the days when Calcutta was faced with a plague scare, his great influence was thrown into the scale to steady and rally public opinion in favour of the measures proposed. He opened no less than eight private plague hospitals for the treatment of patients of respectable class who refused to go into the ordinary segregation hospitals. During the Great War he carried out an intensive campaign on behalf of the Government of India War Loans, succeeding in securing the investment of over two crores of rupees. Finally, he has left in the literature a long series of some thirty or more medical and scientific papers, dealing with such diverse subjects as epidemic dropsy, cholera in Bengal, small-pox, diabetes among Bengalis, the use of drugs of addiction in India, water supplies, tanks, and town-planning.

Sir Kailas was a man whom it was an honour and a privilege to have known. Dignified, courteous, stately in presence, he was an ideal host. In speech he was never hurried, spoke slowly, and never gave anything but his matured judgment. At the meetings of the Governing Body of the Endowment Fund of the Calcutta School of Tropical Medicine his advice and his help from the Indian point of view were invaluable; he was ripe in years, experience, and wisdom. Further, there was no Indian in India with a clearer vision of both past and future, and none whose considered opinion carried more weight. Whether the matter under discussion affected the Calcutta University, the School of Tropical Medicine, or the Medical College or other charitable institution, his advice and his opinion were always eagerly sought for, though not always immediately given. Further, his extensive practice and extensive

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acquaintance among the wealthy and commercial Indian communities of Calcutta enabled him to sound real Indian opinion with regard to different philanthropic projects in a way that would have been impossible to almost any other citizen of Calcutta.

In Sir Kailas Chandra Bose, Calcutta loses one of her greatest and most representative of citizens, and Bengal one of her foremost pioneers. His loss will be keenly felt by both the European and Indian communities of Calcutta, whilst the memory of his unstinted generosity and of his splendid philanthropic efforts will remain as a tradition for the future.

Service Notes.

APPOINTMENTS AND TRANSFERS.

Major-General F. H. G. Hutchinson, C.I.E., M.B., I.M.S., to be Honorary Surgeon to the King, Indian Military Forces, *vice* Major-General Sir R. C. MacWatt, K.C.I.E., M.B., F.R.C.S., I.M.S. (retired), 1st October, 1926.

The King has been graciously pleased to give orders for the following appointment to the Most Honourable Order of the Bath:—

To be Ordinary Member of the Military Division of the Third Class, or Companion of the said Most Honourable Order.

Colonel C. Hudson, C.I.E., D.S.O., F.R.C.S.E., I.M.S., Assistant Director, Medical Services, Aden Brigade, Aden.

Lieutenant-Colonel D. Heron, C.I.E., I.M.S., an Agency Surgeon, on return from leave, is posted as Residency Surgeon, Mewar, with effect from the 15th January, 1927.

The services of Lieutenant-Colonel J. Morison, M.B., I.M.S., Assistant Director, Haffkine Institute, Bombay, are placed temporarily at the disposal of the Government of Burma, with effect from the 30th November, 1926, for appointment as officiating Director of the Pasteur Institute, Rangoon.

On return from leave Lieutenant-Colonel M. Mackelvie, C.I.E., M.B., F.R.C.S.E., I.M.S., is appointed to be Civil Surgeon, Dacca, with effect from the forenoon of the 31st January, 1927.

Lieutenant-Colonel W. L. Harnett is appointed to officiate until further orders as Professor of Clinical and Operative Surgery, Medical College, Calcutta, *vice* Lieutenant-Colonel H. B. Steen, granted leave.

Lieutenant-Colonel C. A. Godson, M.C., I.M.S., is appointed Civil Surgeon of Hooghly, with effect from the afternoon of the 12th January, 1927.

He is also appointed to act as Civil Surgeon of Serampore in addition, with effect from the same date, until further orders.

The following officers of the Indian Medical Service are appointed substantively to be Agency Surgeons under the Government of India in the Foreign and Political Department, with effect from the dates shewn against their names:—

Major W. J. Simpson—13th August, 1924.
Major F. Stevenson—5th October, 1924.
Major C. H. Smith, O.B.E.—8th April, 1925.
Major L. H. L. Mackenzie—17th July, 1925.

The services of Major H. S. Anand, I.M.S., are placed temporarily at the disposal of the Government of Burma, with effect from the date on which he assumes charge of his civil duties.

The services of Major S. D. Billimoria, I.M.S., were placed temporarily at the disposal of the Government of the Punjab, with effect from the 17th January, 1927.

Major H. Hingston, M.D., I.M.S., did general duty at the Presidency General Hospital, Calcutta, from the afternoon of the 12th to the afternoon of the 27th January, 1927.

Major N. C. Kapur, I.M.S., is appointed to do general duty at the Medical College Hospitals, with effect from the forenoon of the 24th January, 1927, until further orders.

The services of the undermentioned Indian Medical Service officers are placed permanently at the disposal of the Government of Bombay, with effect from the dates shown against their names:—

Major E. S. Phipson—28th November, 1925.
Major A. H. Harty—20th September, 1926.
Captain J. M. Shah—2nd May, 1926.

LEAVE.

Lieutenant-Colonel H. B. Steen, I.M.S., officiating Professor of Clinical and Operative Surgery, Medical College, Calcutta, is granted leave from the 1st April 1927 (or from the date on which the leave is availed of), to the 29th September, 1927.

Major E. H. V. Hodge, I.M.S., Surgeon to His Excellency the Governor of Bengal, is allowed combined leave for one year, with effect from the 30th March, 1927, or from any subsequent date on which he may avail himself of the leave.

PROMOTIONS.

Lieutenant-Colonel to be Colonel.

Lieutenant-Colonel W. O's. Murphy, M.B., *vice* Colonel J. H. McDonald, M.B., K.H.P., retired. Dated 1st November, 1926.

The undermentioned Lieutenant-Colonels of the Indian Medical Service to be Brevet-Colonels, with effect from the 1st January, 1927:—

A. Spitteler, O.B.E.
J. Norman Walker.

Majors to be Lieutenant-Colonels.

Pheroze Kharsedji Tarapore. Dated 2nd February, 1927.
Dwarkanath Dhamaji Kamat. Dated 2nd February, 1927.
William Edward Rees Williams, O.B.E., M.B. Dated 2nd February, 1927.
Alexander Frederick Babonau, C.I.E., O.B.E., M.B. Dated 2nd February, 1927.
Sorabji Jamasji Bhathena. Dated 2nd February, 1927.
G. E. Malcomson, M.D. Dated 20th January, 1927.
H. W. Acton. Dated 27th January, 1927.
V. B. Green-Armytage, M.D. Dated 27th January, 1927.
A. N. Dickson, M.C., M.D. Dated 27th January, 1927.
A. J. H. Russell, C.B.E., M.D. Dated 27th January, 1927.
R. E. Wright, M.D. Dated 27th January, 1927.
D. H. Rai, M.C., M.D. Dated 27th January, 1927.
F. A. Barker, O.B.E., M.B. Dated 27th January, 1927.
A. N. Thomas, D.S.O., M.B. Dated 27th January, 1927.

Captains to be Majors.

H. Aung Khin, M.B., F.R.C.S.E. Dated 19th November, 1926.
M. A. Singh, M.B. Dated 27th December, 1926.
Frank Oppenheimer. Dated 30th July, 1926.
Ulick Joseph Bourke. Dated 21st January, 1927.
Sundar Das Sondhi, M.C., M.B. Dated 20th January, 1927.

Lieutenant to be Captain.

T. J. Davidson, M.B. Dated 6th June, 1926.

RESIGNATIONS.

Subject to His Majesty's approval, Captain M. F. D. Graham, M.D., I.M.S., is permitted to resign the service with effect from the 18th February, 1927.

RETIREMENT.

Subject to His Majesty's approval, Lieutenant-Colonel M. N. Chaudhuri, I.M.S., is permitted to retire from the service, with effect from the 27th January, 1927.

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NOTES.

RYTHMIN, CARNRICK & CO.

THE increase in intestinal and hepatic disorders in recent years has been marked. Particularly in sedentary walks of life is there need for the physician's services in maintaining a normal hepato-intestinal condition.

Bile salts, as is well known, are the only substances which directly stimulate bile production. They also increase peristalsis. Bile salts are to-day recognised by pharmacologists as the only true stimulant to excretion of bile. All other drugs, such as calomel, podophyllum, some of which have been highly regarded for these effects, have been found upon careful scientific examination to be devoid of such action on the liver.

The peristaltic principle in gastric mucosa was demonstrated by Zuelzer, and was later shown to be present in large quantities in the spleen. The hormones secretin and gastrin shown by Bayliss and Starling and by Edkin to increase the pancreatic, gastric, biliary and intestinal secretions are contained in the desiccated substance of the duodenal and gastric mucosæ.

Rythmin (G. W. Carnrick Co. 421 Canal Street, New York City), which combines these therapeutic principles therefore is a true cholagogue and in addition to its laxative effects, maintains a normal flow of bile through the bile ducts, thus offering an effective therapeutic agent in the treatment of biliary insufficiency, gall-stones and obstructive jaundice.

H. R. NAPP'S PREPARATIONS.

THREE preparations by the firm of H. R. Napp, 3 & 4 Clements Inn, Kingsway, London are of interest. The first is "Normocol"—an intestinal evacuant, non-injurious, non-habit-forming, and pleasant to take. It consists of sugar-coated granules of desiccated plant mucus of the Bassorin group, which possesses an enormous power of absorbing water, swelling to a soft mass enormously greater than its original bulk. Thus it is claimed that in contact with water a teaspoonful of Normacol will swell to a volume equal to that of 9 lbs. of cauliflower, 7 lbs. of apples, or 16 lbs. of bread. The result of its administration is to produce a regular mechanical evacuation free from griping, and of considerable bulk. The dose is one heaped teaspoonful, taken with a draught of water, tea, or coffee once or twice a day after the principal meals. The preparation is one which is especially suitable for children.

"Mastan" is a bacterial antigen, made from strains of streptococci, staphylococci, Pfeiffer's bacillus and tuberculosis bacilli, put up in capillary tubes similar to those used for vaccinial lymph, and intended to be used by a scarification and rubbing in technique similar to that employed in vaccination. It is of value in the treatment of acute and chronic inflammations, synovitis. erysipelas, acne, neuritis, and furunculosis. The reactions are as a rule considerable, but are followed by rapid improvement of symptoms.

"Neo-reargon" is a chemical compound of silver and anthraquinone glucosides, containing about 14 per cent. of silver in ionised form. Both silver salts and anthraquinone glucosides have a destructive action on the gonococcus, whilst the latter penetrate into tissues well and have an analgesic action. The preparation is intended for administration by the urethra in cases of gonorrhœa. The liquid is injected and the patient directed to retain it in the urethra as long as possible. A 5 per cent. solution may be used for abortive treatment of gonorrhœa, 5 or 6 injections being given on the first day, and 3 or 4 a day for the next few days. For an established anterior urethritis a 2½ per cent. solution may be injected four times a day; for posterior urethritis injections of a 1 to 2 per cent. solution may be practised 2 to 3 times daily, or posterior urethral irrigation with a 1|4 per cent. solution. The solution must be made up in distilled water, as chlorides affect the compound and precipitate the silver in it. The analgesic properties of the compound render it especially suitable for acute cases accompanied by much pain. A brochure issued by the firm gives full and detailed instructions for its use in different types of cases.

THE RAI SAHEB SHAMBHU DAYAL SAHEB GOLD MEDAL.

WE have received the notice given below with regard to the award of this gold medal for 1927 from the Director of Public Health, United Provinces. It should be noted that entries are limited to those residing in the United Provinces only, and that the essay should be written in Hindi.

1. A gold medal called the "Rai Saheb Shambhu Dayal Saheb Gold Medal" will be presented for the best prize essay on a public health subject to be announced each year.
2. The subject for the essay for 1927 is "Inculcation of health habits among the inhabitants of urban areas."
3. The competition will be open to the general public of the United Provinces.
4. The essay is to be written in Hindi and should not exceed 3,000 words in length.
5. The essay should reach the Director of Public Health, U. P., Lucknow, by May 31, 1927.
6. The name and address of the competitors must be distinctly written on each essay submitted, and the envelope should have the words "Prize Essay" in the top left hand corner.
7. The Director of Public Health, U. P. shall judge the merit of the essay and his decision with regard to the award of the medal shall be final.
8. No correspondence will be entered into on the subject to competition.
9. No essay will be returned.

CHEMISTS' EXHIBITION, LONDON.

THE 32nd Chemists' Exhibition will take place on May 9th to 13th, 1927, at the Holland Park Hall, London, W. The Exhibition was established in 1896, and has filled a very important need to the practising pharmacist in enabling him to see all the goods he sells and apparatus, etc., he uses in his profession under one roof. The management is always delighted to welcome visitors from the Dominions and Colonies, and such gentlemen will be admitted on presentation of business card. The exhibition is organised by the *British & Colonial Pharmacist*, and is strictly confined to the Trade. The General Strike in England in May last caused the abandonment of the 1926 Exhibition and the amount of support already guaranteed assures that the 1927 event will be much the largest and most important yet held.

Publishers' Notice.

SCIENTIFIC Articles and Notes of interest to the profession in India are solicited. Contributors of Original Articles will receive 25 reprints *gratis*, if asked for at the time of submitting their manuscripts.

Communications on Editorial Matters, Articles, Letters and Books for Review should be addressed to THE EDITOR, *The Indian Medical Gazette*, c|o The Calcutta School of Tropical Medicine, Central Avenue, Calcutta.

Communications for the Publishers relating to Subscriptions, Advertisements, and Reprints should be addressed to THE PUBLISHERS, Messrs. Thacker, Spink & Co., P. O. Box 54, Calcutta.

Annual Subscription to "The Indian Medical Gazette," Rs. 16 including postage, in India. Rs. 18 including postage, abroad.

Papers and articles forwarded for publication are understood to be offered to *The Indian Medical Gazette* alone, and any breach of this rule will be followed by non-publication.

The Editors of *The Indian Medical Gazette* cannot advise correspondents with regard to prescriptions, diagnosis, etc., nor can they recommend individual practitioners by name, as any such action would constitute a breach of professional etiquette.

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Original Articles.

A PLEA FOR A THOROUGH INVESTIGATION OF THE FILARIASIS PROBLEM.*

By SIR FRANK CONNOR, D.S.O., F.R.C.S. (Eng.),
LIEUTENANT-COLONEL, I.M.S.,
Professor of Surgery, Calcutta Medical College.

ENORMOUS INCIDENCE OF FILARIASIS.

THE surgical onlooker in the tropics, who has few opportunities for laboratory work and fewer opportunities for field work, becomes more and more impressed with the magnitude of the filariasis problem and its many ramifications. It also appears to him, rightly or wrongly, that no concerted effort is being made to deal with it.

Filariasis may be compared to an evil genius, whose stakes are human lives, and whose dice are heavily loaded. Surely we must do something to destroy this genius, or at least to unload the dice.

The incidence of filarial disease is at present incalculable. Its ravages have been traced throughout vast areas of the tropical and subtropical world; parts of S. Europe, India, China, the Pacific Islands, Australia, the West Indies, and many other tropical lands are known to be infected. Clinically one soon discovers that it is broader and longer than its allotted span, or to change the metaphor, that it too often calls in accomplices, more malevolent than itself, to work its wicked will. The streptococcus is one of the worst of these.

The pathological manifestations of *F. bancrofti* are too well known to need any description here, but the very fact of our familiarity with these manifestations seems to deceive us into thinking that we really understand the mode of their production.

MANY GAPS IN OUR KNOWLEDGE.

The discoveries of Manson, and the work of his successors have placed on a sure basis the mosquito phase of *F. bancrofti* and many facts in connection with the life-history and pathology of the parasite in the human host. There are still, however, very serious gaps in our knowledge.

(*i*) Experimental evidence is needed to tell us exactly what happens after the metamorphosed microfilariæ enter the human host from the mosquito. They are next found as sexually mature filariæ coiled together in the lymphatic vessels and glands, the females laden with embryos which are poured into the blood stream. We know very little of the intermediate stages.

(*ii*) Information is also badly needed as to how the adult filariæ destroy and obstruct the lymphatic vessels and glands; is it a mechanical process, or by the help of a toxin?

(*iii*) With regard to the microfilariæ, we know that their presence in the blood in countless millions is not necessarily associated with any clinical symptoms. Are they capable of producing pathological changes under other conditions? The reasons for their habit of nocturnal or diurnal periodicity are also not at all well understood.

(*iv*) When we come to the pathological manifestations of filariasis, questions are even more easy to ask and more difficult to answer. What is filarial fever? Is it caused directly by filarial activities or by a secondary factor, such as streptococcal infection? What is the periodicity of filarial fever due to?

(*v*) Then with regard to the varying types of lymphatic obstruction, the solid elephantiasis, the soft lymph scrotum, the solid œdema which may come in one night, the small localised patches of œdema, the lymphatic and gland varices, etc., the details of all of these require elucidation. Some cases are definitely associated with streptococcal or erysipelatoid attacks, others are not.

(*vi*) Hydroceles in the tropics are very puzzling as to their ætiology. Many are obviously associated with filarial infection. The commonest type of hydrocele in Bengal, however, occurs in cases without any filarial manifestations. The globus major of the epididymis is dusky red in early cases and of a firm consistency; in more chronic cases, the process has spread downwards towards the globus minor, the consistency is still harder and the digital fossa is completely obliterated by an adhesive process. What is the pathology of these cases?

The above-mentioned are a few of the puzzles which filariasis provides and which still require unravelling.

SCATTERED NATURE OF PRESENT INQUIRIES.

As far as India is concerned, there seems to be no organised attempt in being, or in prospect, to deal with a disease which is known to be causing misery to some millions of its inhabitants. Sporadic efforts are being made, it is true, but surely this vast question is worthy of more liberal treatment.

Leprosy is a disease of much smaller incidence, causing less misery and a much lower mortality. Yet leprosy claims more abundant funds and highly skilled workers. These efforts are most praiseworthy in their attempt to prevent and cure a most disgusting disease, but they leave one wondering the more at the comparative neglect of a disease of much greater importance.

NEED FOR SOMETHING ON THE LINES OF A "FILARIASIS COMMISSION."

Past researches in India and in other places have taught us that filariasis cannot be studied in the laboratory alone. A mosquito survey is essential together with local investigation of the causes that are responsible for the sharp

* Being a paper read at the *Indian Science Congress*, Lahore, in January, 1927.

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differences which occur in the filarial incidence and clinical manifestations of the disease in neighbouring villages or districts.

It is not likely that individual efforts will settle these problems, and prophylactic and curative measures cannot be evolved unless a proper understanding is arrived at as regards the ætiology and pathology of the infective process.

It was in India that the problem of malaria was solved. The problem of filariasis has already been partly solved by Manson, but as regards prophylaxis and cure we are still very much in the dark. It would be very fitting if this work could be completed in India, for filariasis is to tropical surgery what malaria is to tropical medicine. The Indian Science Congress could do much by adding the weight of its authority to a demand for a "Filariasis Commission," or some such organised effort to unravel these hidden aspects of filariasis.

CLINICAL EVIDENCE FAVOURS THE VIEW THAT EARLY TREATMENT IS LIKELY TO BE VERY SUCCESSFUL.

The treatment of filariasis has been very disappointing, and this is not to be wondered at when one considers our ignorance regarding its detailed pathology. It is quite possible that early infections could be effectively controlled, before the parent worms had, as it were, dug themselves in. Unfortunately early diagnosis is not yet possible.

Tartar emetic and many other well-known vermicides have been tried without much success. The author has, however, been much impressed with the fact that the persistent use of "soamin" hypodermically or intravenously seldom fails to give some measure of relief with regard to the many and very distressing symptoms. One has to speak with great caution when discussing such a subject, as the symptomatic vagaries of filariasis are of common knowledge. The disappearance of microfilariæ from the blood is also not a test of any great value. It would appear that in *early cases* soamin does do something to alleviate symptoms. If this is true, other arsenical derivatives may well be more efficacious. One is most impressed by the testimony of young Indian doctors who have suddenly discovered themselves to be the victims of filariasis by the appearance of some acute symptom for the first time. These can be regarded as fairly reliable witnesses. Several cases of this sort have come to the notice of the authorities. One was a young doctor, who worked with his own microscope. A sharp attack of fever associated with swellings of the inguinal lymph glands aroused his suspicions and he at once examined a smear of his night blood, to find it full of microfilariæ. Intravenous injections of soamin were at once started with the following dosage: bi-weekly doses, two of gr. 1, two of gr. 2, and two of gr. 3, i.e., 12 gr. in all. After a week's interval, this course was repeated and great improvement has followed. A most important advance in the treatment of filariasis would be the discovery of a test by means of which an early diagnosis of infection could be established. Drugs which are ordinarily of no avail might well be more efficacious when pitted against young filariæ, which are lying loosely in the tissues, not yet protected by a resistant fibrous tissue capsule.

Mortality from filariasis, though seldom direct, is probably enormous.

The devious ways in which filarial affections manifest themselves can only be appreciated by a long residence in the tropics. Cellulitis, gangrene, erysipelatous attacks, abscesses, acute exacerbations of fever, chylous extravasations, are only a few of the ills which are well known to be filarial in origin and which may kill outright, or wear away a patient. It is by its innumerable complications, therefore, that the mortality of filariasis is to be estimated and there can be no doubt whatever that the total mortality is very considerable.

Clinical evidence proves that the sick-rate involved, and therefore the industrial loss, is very great.

One has only to realise the clinical history of a case of elephantiasis of the legs or scrotum, or of recurring chylous extravasation, to appreciate the truth of this statement. In many cases chronic invalidism results, in others wage-earning capacity is much lowered by recurring exacerbations of a febrile or inflammatory nature. It is very difficult to estimate the numbers who are thus afflicted, but in endemic zones many thousands must be involved.

Has the time not arrived for organised and co-ordinated enquiry on the proper scale into the filariasis problem of India?

A NEW SPECIES OF ANOPHELINE *A. PSEUDOJAMESI* COMMON IN BENGAL.

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and
K. L. CHOWDHURY, M.B., D.P.H.,
Malariologist
(*Indian Research Fund Association*, 1926–27).

(*MS. received for publication, 17th March*, 1927.)

DURING an anopheline survey of Bengal, financed by the Indian Research Fund Association, which has been carried out during the recent financial year (1926-27), a species in the larval state was encountered, which was at first, in the absence of actual specimens or of any more complete description than that given by Stephens and Christophers (1902) or by James and Liston (1911), thought to be *pulcherrimus*. This idea, however, became suspect when a specimen hatched out and the imago presented itself as *jamesi*, and was diagnosed as such in spite of the larva in the case being very unlike that of *jamesi* (see Figs. 1 and 2).

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When in the course of the survey, however, very many more specimens (from all over Bengal) were obtained and the larva was invariably* distinct in several respects from *jamesi*, the matter was studied afresh and it was then found that the adult was also constantly distinct from *jamesi* (Fig. 3); in one male specimen the genitalia being examined and noted to be different from this species (Figs. 4 and 5). It was on these grounds considered to be new, and we have named it *pseudojamesi*.

In our study of the species we came to learn that the larva is peculiarly and uniformly dark in coloration, a deep sage-green, and of a delicate and fine structure; which points enabled one to distinguish them by the naked eye, e.g., when mounted serially with other species on a glass slide for microscopic examination. Moreover, they required special care as compared with well-known species to ensure their hatching out.

With regard to the microscopic structure of the larva and adult, we will now give as complete an account as possible, adding a note on the habitat of the larva.

STRUCTURE OF THE LARVA.

(See Figs. 1 and 2.)

General Characters. All chitinous structures uniformly pigmented dark greenish-grey.

Head:—antenna: short spines all over, and darkly pigmented throughout its whole length.

clypeal hairs:—(See Fig. 1.) *antero-internal:* very long, thin, straight, pigmented dark grey. Slight fraying usually noticed, but in some specimens simple hairs have been observed. *antero-external:* short, straight, and distinctly frayed; about half the length of the antero-internal. *Posterior:* short, thin, straight, simple, and situated in a line with the antero-internal.

frontal hairs: six well-developed long branched hairs.

occipital hairs: both simple.

Thorax: antero-thoracic hairs are of the normal type; they carry a pair of rudimentary palmate hairs.

Abdomen:—palmate hairs on segments 1—2 rudimentary; on segments 3—7 well-developed; leaflets with short filaments about a quarter of the blade in length. (See Fig. 2.) *dorsal plaques* are uniformly pigmented dark grey and oval in shape.

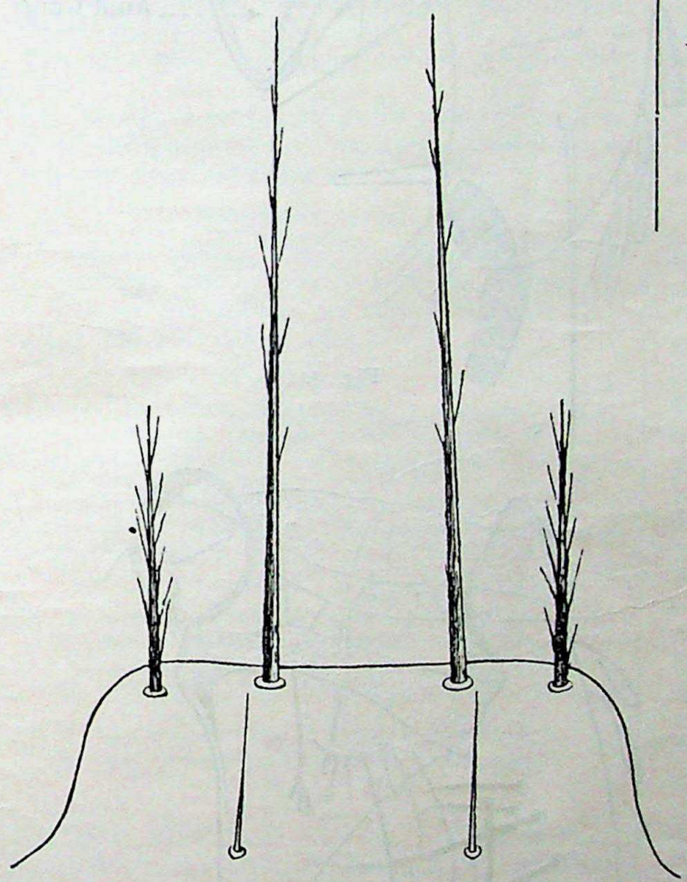

Fig. 1.

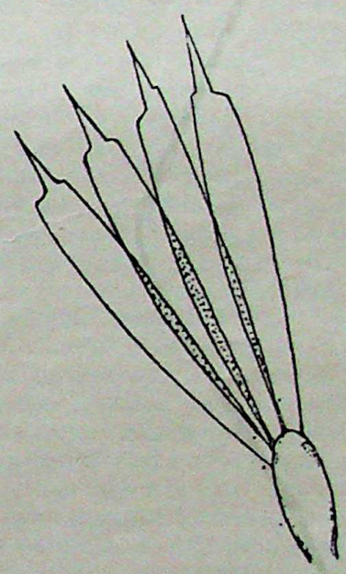

Fig. 2.

DIAGNOSIS FROM CERTAIN OTHER LARVÆ.

	A. jamesi.	*A. maculipalpis.*	*A. pseudojamesi.*
(*a*) Clypeal hairs.			
Antero-internal	thickly frayed	distinctly frayed	very fine fraying (sometimes).
Antero-external	heavily-branched; 2/3 of ant.-int. in length	thick fraying, 2/3 of ant.-int. in length	thin fraying, ½ the length of ant.-int.
Posterior	branched	simple, relatively long	simple, short and thin.
(*b*) Palmate hair on abdominal segts.	well-developed on 2—7 segts.	well-developed on 1—7 segts.	well-developed on 3—7 segts.
Filament	long and sharp	short and blunt	short and sharp.

* No annectant forms have at any time been discovered.

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THE LARVAL HABITATS IN BENGAL.

The species has been captured in the following places, which illustrate its type of breeding place:—

	Districts.	*Place.*	*Breeding places.*
(1)	Malda	Rohanpur	River Purna Babamar (a dying river with much floating vegetation).
(2)	Khulna	Khulna (town)	temporary pool of water.
(3)	Mymensingh	Bidyagunj	borrow-pit for huts.
(4)	Nadia	Badkulla	large tank.
(5)	"	Kanchrapara	the Kulia Bhil.
(6)	Burdwan	Memari	long railway cutting (borrow-pit).
(7)	"	Katwa	borrow-pit for railway line.
(8)	Faridpur	Pachooria	long railway-cutting.
(9)	Noakhali	Chaumuhani	long railway-cutting.

THE ADULT STRUCTURE (Figs. 3, 4 and 5).

Both the male and female have their legs with spotted tibiæ and femora and the hind legs have the 3 terminal segments *plus* the articulation on the second inter-tarsal joint continuously white. The first inter-tarsal joint is also banded (see Fig. 3).

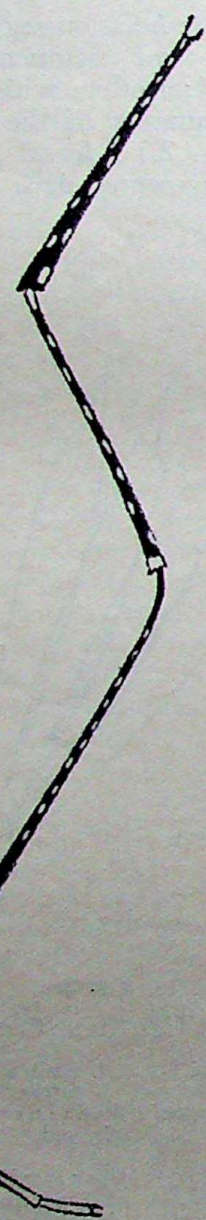

Fig. 3.

In all other respects except in the male genitalia the species is similar to *A. jamesi*.

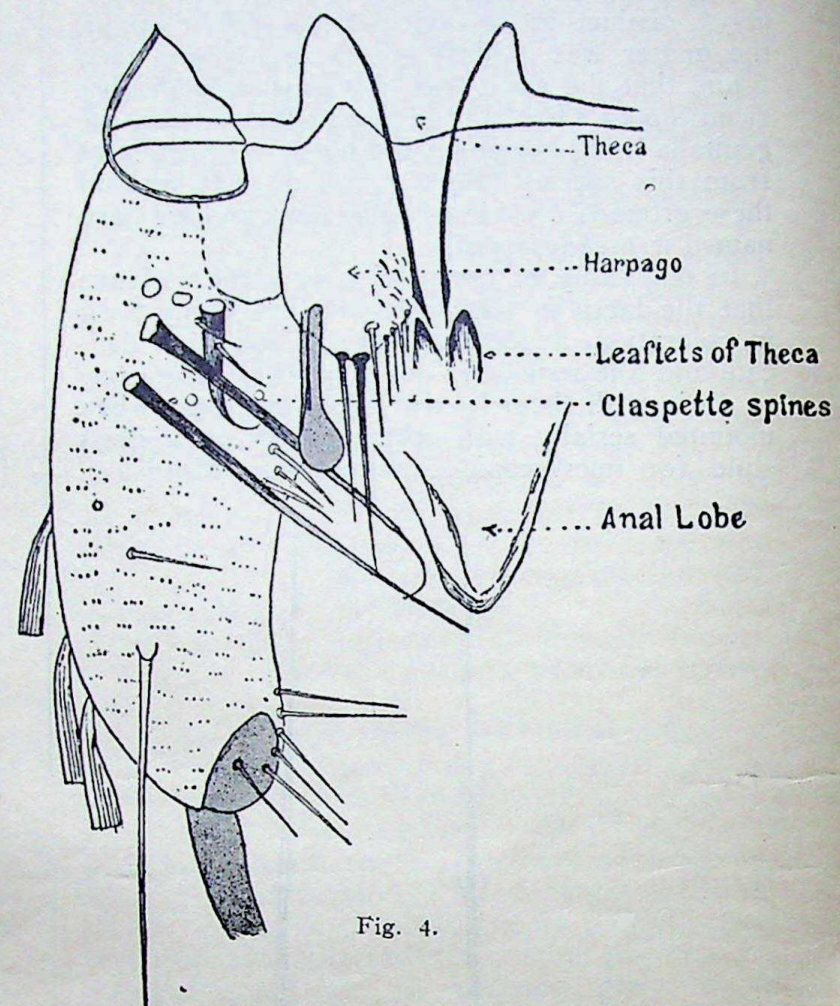

Fig. 4.

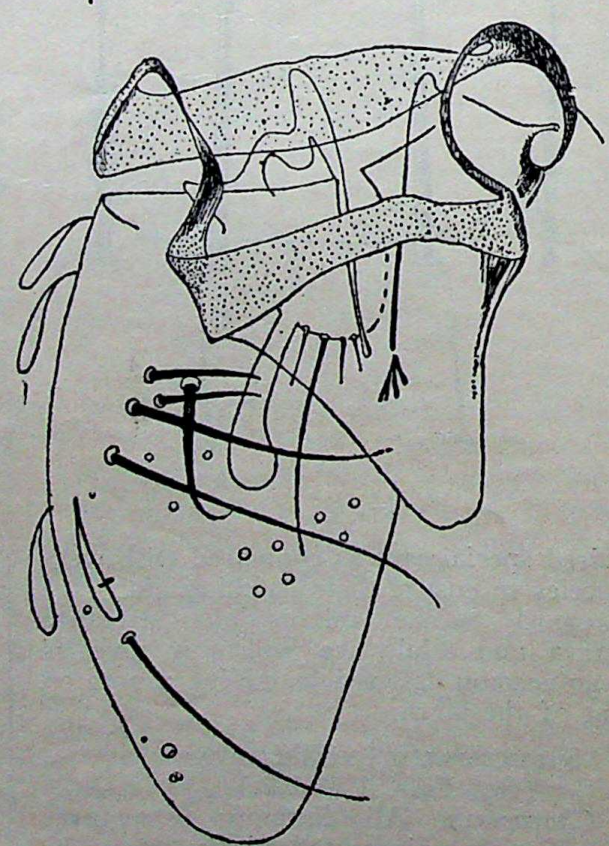

Fig. 5.

Male genitalia:—(as in Fig. 4): *claspette* spines 5, disposed as in the figure, with a

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horizontal line of 3 and a fourth spine immediately below forming part of the cluster. The 4th spine is longer and stouter than any of the first three. There is a 5th slightly below and to the outside of the 4th. The inner portion of the lower half of the ventral surface of the clasper is beset with 6—8 long straight hairs arising from papillæ. Accessory hairs are numerous and very small. About 6—8 medium size accessory hairs below the cluster of spines.

Harpago unilobular with ventral club. Apical hair a little longer than the club. An accessory hair with thick chitinous base external to the apical hair and about ¾ of its length. Internally about half-a-dozen long thin hairs with basal papillæ; minute hairs cover the inner portion of the organ.

Theca more than half the length of the clasper, with thick chitinised margin and rather strongly chitinised leaflets.

Anal lobe reaches slightly below middle of clasper.

The 5th figure is *A. jamesi* for comparison and it shews the distinctive points from *pseudojamesi*. It is taken from Christophers (1916).

PATHOGENICITY.

Of course nothing can be said regarding its pathogenicity, but in our 6 months survey we took 101 of the species as compared with 316 *aconitus* and 220 *culicifacies*.

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EXPLANATION OF PLATES.

Fig. 1. the larval clypeal hairs of *A. pseudojamesi*.
" 2. the larval palmate hairs, a few leaflets, of *A. pseudojamesi*.
" 3. the adult female hind-leg of *A. pseudojamesi*.
" 4. the male genitalia of *A. pseudojamesi*.
" 5. and for comparison those of *A. jamesi*.

A SHORT REPORT ON SOME THERAPEUTIC INVESTIGATIONS CARRIED OUT AT THE RANCHI EUROPEAN MENTAL HOSPITAL.

By OWEN BERKELEY-HILL,
LIEUTENANT-COLONEL, I.M.S.

DURING the past year my four assistants have been kind enough to investigate for me certain forms of treatment for psychotic disorders which have been brought to our notice. The results of the investigations are as follows:—

(1) *Treatment by induction of aseptic meningitis:*

In October, 1923, Dr. Carrol published in the *New York Medical Journal* a paper entitled: "Aseptic meningitis in combating the dementia præcox problem." Further investigation of this form of treatment was later carried out by Drs. Carroll, Barr, Barry and Matzke. The results of their observations were published in the *American Journal of Psychiatry* in April, 1925. As these investigators remark, it has often been observed that improvement sometimes occurs in dementia præcox cases during the leucocytosis of infectious processes. Some years ago, Lundvall of Sweden noted that dementia præcox patients who were losing ground exhibited a leucopenia, whereas when they were improving they shewed a leucocytosis. The final conclusions reached by these four American observers may be summarised as follows: (1) The injection of sterile inactivated horse serum into the spinal canal produces an aseptic meningitis with marked physical reactions. (2) That the mental condition of 66 per cent. of cases of dementia præcox so treated shows improvement which has lasted from 2 to 11 months, several enjoying remissions. Insight is often gained. (3) That a fundamental principle not yet fully determined is involved, the further investigation of which may throw much light on the etiology of dementia præcox.

At my request, Dr. J. N. J. Pacheco undertook to apply this form of treatment to six selected cases of dementia præcox. The routine followed was: A day prior to the beginning of the treatment, the patient was admitted into the infirmary ward and put to bed on a milk diet. Calomel (½ gr.) was given in the evening and a saline purge in the following morning. It was decided to inject 20 c.c. of horse serum. A sufficient quantity of blood was drawn from the vein of a horse and allowed to stand in test tubes. The supernatant serum was drawn off. As much difficulty was experienced in getting enough blood for repeated injections, we tried the horse serum manufactured by Messrs. Burroughs Wellcome & Co. Unfortunately no reaction could be got with this serum, a fact we attributed to the possible inclusion of preservatives in the serum. Finally, a supply of fresh inactivated serum was got from Kasauli. As a rule 20 c.c. were injected into the spinal canal through the third lumbar interspace. To render the injection painless, 1 c.c. of aposthesine was injected locally. A spinal needle was then introduced and 20 c.c. of cerebro-spinal fluid withdrawn and an equal quantity of serum injected at the same rate. The patient was then put to bed and the lower end of the bed raised about a foot off the ground to allow quicker circulation to the cerebral meninges. The temperature, pulse and respiration were noted every hour. The nurse was given instructions to report any symptoms of vomiting, purging or collapse. The patient was kept on a milk diet. No other treatment was given. In all six cases were thus treated. On the whole the results were disappointing as compared with those obtained by other workers who have claimed 50 per cent of successes. The cases were as follows:—

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Case 1.—S. C., Anglo-Indian male, aged 25. Negativistic. Unclean and slovenly. Temporal and spatial disorientation. Occasionally sings or shouts in Bengali. On 16th July, 1926, injected 19 c.c. Reaction nil. Temperature rose to 99°F. on the 17th. After that the temperature fell to normal and remained so. On the 24th July, patient was again injected with 17 c.c. Temperature rose to 101°F. in four hours. The day following the temperature fell to 99°F. After that the temperature was normal and remained so. During the period of mild pyrexia the patient seemed brighter and complained of severe headache. He replied readily and with attention to questions. On 20th October, he was again injected with 20 c.c. The temperature rose to 100°F. and remained so until 22nd. After that date it was normal. There was no marked leucocytosis beyond a relative eosinophilia of 8.8%. On 4th November the patient was again injected with 20 c.c. The temperature rose to 100°F. and remained so for two days. On the 16th November the patient was again injected with 20 c.c. The temperature rose to 101°F. on that day and then remained normal. No improvement took place in the patient's mental condition.

Case 2.—C. M., Anglo-Indian, male, aged 24. Negativistic. Completely disorientated in time and space. Injected on 9th July with 18 c.c. serum. Temperature stood at 100°F. for two days. Afterwards normal. No leucocytosis. Eosinophilia 4.1%. No change in mental condition.

Case 3.—A. A. K., Anglo-Indian, male, aged 25. Untidy and unkempt. Disorientated in time and space. Morose and sullen. Constantly spitting about and scribbling on the walls and floors. Injected on 21st October, with 19 c.c. serum. After eight hours temperature rose to 100°F. Temperature normal on the third day. Again injected on 4th November with 20 c.c. Temperature 102°F. on the following day. Normal on the 26th. Patient has stopped spitting but otherwise there is no change in his mental condition.

Case 4.—E. R., Anglo-Indian, female, aged 35. Negativistic, apathetic and silent. On 8th July injected with 9 c.c. fresh horse serum. Temperature rose to 103°F. four hours after the injection. Severe headache and vomiting. Very restless. Asked for refreshment. Kept groaning and shouting. Temperature fell gradually to normal on the 11th July. Again injected with 17 c.c. on the 16th July. Temperature rose to 103°F. in four hours. Temperature fell gradually and was normal on 19th July. Eosinophilia 11%. No change in mental condition. This patient has gradually grown feebler and feebler, both mentally and physically.

Case 5.—F. J. C., Anglo-Indian, female, aged 36. Noisy, abusive, dirty and loquacious. Injected on 3rd December with 10 c.c. serum. Temperature rose to 99°F. after eight hours. Temperature was 100.6°F. on the following day. Fell to normal on the 6th December. On 10th December patient was again injected with 20 c.c. serum. In four hours the temperature rose to 102.4°F. The temperature remained at this level until the 12th December. On the 15th the temperature was normal. During the febrile stage the patient was very quiet. Eosinophilia, 0.4%. No change in the mental condition.

Case 6.—H. B., European female, aged 40. Noisy, abusive and dirty. On 10th December she was injected with 20 c.c. This patient would not lie down under any circumstances so there was no reaction. On the following day the temperature was 99°F. and on the next day it was normal. No change in the mental condition of the patient.

In spite of the very disappointing results with these six cases, I am glad to be able to state that Dr. Pacheco intends to carry the investigation further and to publish a report when he has collected more data.

(2) *The intensive use of bromides:*

It seems that Ulrich of Zurich was the first to employ bromide to the point of marked intoxication in the treatment of mental disorder. He claims to have treated successfully 10 cases of melancholia by giving his patients huge doses of bromide. Later Klaesi employed a somewhat similar line of treatment, using somnifen and luminal. In January 1926, Dr. William W. Wright of the Utica State Hospital, published a paper in the *American Journal of Psychiatry* in which he suggested a new method of treating functional psychoses by bromide intoxication. Dr. Wright summarises his results as follows:—

Patients showing marked habit deterioration such as soiling, wetting, and destructiveness, become (as a consequence of this treatment), less destructive and better able to care for themselves; and patients given to outbreaks of violence, with a tendency to assault, become much better adjusted to their environment, and their activities are more easily directed into useful channels. Agitated, depressed states show much less agitation and take food more willingly; some gain in weight providing that a toxic state can be avoided; some recover. Patients requiring tube feeding will, as a rule, take food voluntarily after bromide has been given in the feeding for two or three days. Some patients shewing marked regression have their attacks terminated by the treatment. Autoeroticism usually resists rather stubbornly for a time but finally responds to treatment. The conditions which respond best to treatment are usually those in which some degree of tension is shown, indicating that the fight has not yet been entirely given up. The more lasting improvements are found, naturally, in those cases previously regarded as having a favourable prognosis. Most of the failures have occurred in states of apathy. Dr. Wright warns us that in the administration of this drug in large doses, both nurses and doctors must maintain a constant and careful observation of each symptom produced by the drug. Not infrequently patients quickly develop stuporous states or other evidence of a toxic condition which require prompt and energetic treatment. For this reason it is necessary to determine as accurately as possible the tolerance to the drug of each case treated, Unless this is done the administration of the drug is not without danger. It is also a dangerous procedure to administer bromide in large doses to a patient who is kept in bed during the treatment. He may develop a stupor which may result in a fatality if the condition is not promptly diagnosed and treated. Hence it is much better to keep the patient up and dressed and walking about. For the relief of toxic symptoms, saline solution by mouth should be freely given to cause prompt elimination of the bromide. Feeble or decrepit patients or patients suffering from organic lung or kidney disease, or heart disease with low blood pressure, should not be treated by this method. With some patients the best results are obtained by the administration of large doses (e.g., 210 grains) for a few days, followed by periods of interrupted treatment, while with others the best results are obtained by daily doses of smaller quantities of

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the drug (e.g., 90 grains). There is no rule whereby one can be guided in the selection of a method; daily observation of the results obtained is the best guide.

At my suggestion, Dr. N. C. Sinha kindly undertook to investigate this line of treatment on selected patients. His observations are as follows:—

Case 1.—E. M. B., Anglo-Indian, female, aged 26. Diagnosis: dementia præcox. Patient highly delusional, very excitable and prone to bursts of the most violent abuse. Weight 80 lbs. Physical health fairly good. Treatment began on 8th December, 1926. Dosage at first was 40 grs. a day, increasing regularly until she took 210 grains a day. Treatment stopped on 21st December. Weight 77 lbs. Patient very much quieter than before and much less abusive.

Case 2.—S. L., Jewess, aged 41. Dementia præcox. At times this patient was violent and aggressive. Given to gnashing her teeth and charging at people, shouting at the top of her voice. At times extremely abusive, using the most filthy language. A poor worker. Very badly behaved at table. Treatment started on 8th December with 40 grains a day. Dosage raised to 210 grains a day. Patient got brominism and treatment had to be stopped for a week. Treatment concluded on 21st January. Patient is very much quieter and very well behaved. For a whole month she has not had a fit of temper. She will acknowledge a greeting, which she has never been known to do before. Is very well behaved at table now. Weight at beginning of treatment 110 lbs. and at end of treatment, 93 lbs.

Case 3.—F. W. B., Anglo-Indian, male, aged 32. Diagnosis: imbecile. Patient always mischievous and sometimes destructive. Up to last July (1926) he had never been dangerous but he suddenly became very aggressive, biting and kicking others. Would dash about the place for no apparent reason. Given to stealing. One day he bit his own hand. Had to be specially watched. Patient slept very badly. Was first put on to treatment with somnifen by the mouth. Result not satisfactory. Bromide treatment was started on 15th January. Dose at beginning 150 grs. daily. Is still under treatment and getting 200 grs. a day. On the whole this patient is now much quieter and better behaved. Weight at beginning of treatment, 127 lbs. Present weight, 130 lbs.

Case 4.—C. V., Anglo-Indian, male, aged 41. Dementia præcox. Weight 127 lbs. Physical condition good. Patient usually quiet and very apathetic. Makes no reply to remarks addressed to him. Much given to growling soliloquies. Occasionally roars to himself. Gets extremely excited at times; utters violent abuse and stamps his feet on the ground with all his strength. Stands constantly aloof. When taken out to morning drill, never marches with the other patients. Bromide treatment started on 7th December with a starting dose of 40 grs., rising to 210 grs. daily. Treatment stopped on 20th January as the patient was getting brominism. Patient is very much quieter now. Does not get fits of excitement. Replies when spoken to. Attends morning drill and marches with the other patients. The male Occupational Therapist reports, "C. V. has not been restless in class; quiet and obedient; willing; behaves fairly well." Weight at end of treatment, 121 lbs.

Case 5.—I. V. C. L., Anglo-Indian, female, aged 27. Dementia præcox. Weight 87 lbs. Physical health fairly good. Always angry, noisy and restless. Given to fits of abusing people. Sometimes strikes herself on the face with her fists or shoes, inflicting severe injuries. Cries and screams at intervals. Full of delusions. Takes no interest in her work. Bromide treatment started on 9th July, 1926, with 40 grs. a day. Dosage raised gradually to 300 grs. daily. After 22 days of treatment patient got brominism severely and had to be admitted into the infirmary ward. Female Occupational Therapist reports that the patient's 'manners and ways have improved .... appears to be gentle and submissive .... her tone of conversation has softened a great deal.... sits quietly and does her work .... still talks to herself.'

(3) *Treatment with malarial fever artificially induced:*

This investigation was carried out by Drs. T. Rama Rao and G. Jagannadha Das. In every instance, with one exception, malaria was induced by injecting into the patient to be treated the blood of another person, who, clinically as well as microscopically, shewed a benign tertian infection. The one exception, a Scots female patient shewing marked catatonia, was treated with a culture of benign tertian parasites especially obtained from the Calcutta School of Tropical Medicine.

Case 1.—J. A. B., Englishman, aged 39, admitted on 16th July, 1924. Weight 159 lbs. Diagnosis: acute confusional insanity. Patient was very boisterous on admission; he shewed delusions of grandeur and hallucinations. He was treated by hydrotherapy from 18th July 1924 to 8th September 1924 without much improvement. As he was restless, noisy and sleeping very badly he was put back on to hydrotherapy on 26th September 1924 for another month. The patient shewed no improvement in his mental condition but he began to sleep better. As an adjunct to the hydrotherapy during the month of August, this patient was injected subcutaneously on the 21st of that month with 2.5 c.c. of blood taken from another patient known to be suffering from benign tertian malaria. On the 9th September, the patient developed a rigor with a temperature of 99°F. The blood shewed *P. vivax* ring-forms. Hydrotherapy was stopped at once. On the following day the temperature rose to 102.8°F. He passed some blood and mucus in his stools. He was put on to Mist. Ol. Ricini 1 oz. four times daily. The examination of the stools was negative. Patient was in a very bad mood all that day. The blood and mucus in the stools stopped. The patient's temperature kept high until the 19th, when it fell to normal. Two days previously he had been placed on Mist. Cinchonæ, 1 oz. twice daily. During the whole of this period the patient was noisy, dirty and abusive. From the 19th onwards the blood was free from parasites. He was kept on Mist. Cinchonæ for 30 days. Temperature remained normal. He was boisterous and highly delusional during the whole of this period and up to the 9th January, 1925, *when he suddenly regained his mental health.* The change was melodramatic. He left the hospital completely cured on 29th January and has remained perfectly well ever since, physically and mentally. His wife has sent us reports on her husband's health every six months. When placed on malarial treatment, the patient weighed 137 lbs. When he left the hospital he weighed 179 lbs.

Case 2.—A. J., Anglo-Indian, aged 35. Admitted on 27th March, 1926. Diagnosis: general paresis. Physical condition poor. Weight 117 lbs. Wassermann reaction ++++. Argyll-Robertson pupils. No Rombergism. Fundi oculi normal except for slight haziness at margins of disc. No paleness. Superficial reflexes slightly increased. Knee-jerks absent. Ankle-jerk increased. No Babinski. Gait steady. Handwriting typical of general paresis. Patient was highly delusional, very boisterous, sometimes destructive; constantly singing, shouting and using abusive language. He was especially abusive to his mother who happened to be also a patient in the hospital. She had been admitted as a voluntary boarder for treatment for a drug-habit. Patient was treated with hydrotherapy. As he remained very boisterous and showed no improvement he was treated with "prolonged sleep," induced by somnifen. He was kept asleep for ten days. He shewed no improvement whatever. On 2nd May he was placed on anti-syphilitic treatment as his Wassermann reaction was strongly positive. On 9th May patient was injected with 1 c.c. of blood from a patient suffering from

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benign tertian malaria. The injection was given intramuscularly. On the 19th the temperature rose to 101°F. The patient was allowed to have eight rigors. The temperature never rose above 103°F. During this period the patient had no treatment other than an occasional dose of magnesium sulphate. The blood examination was as follows:

On 19th May, 1926: Negative for malaria parasites.
On 20th May, 1926: *P. vivax* ring-forms +.
On 28th May, 1926: *P. vivax* ring-forms ++.
On 31st May, 1926: Subtertian crescents +.

Subtertian crescents appeared in the blood until 6th June. On the 27th May, the patient's condition was serious. He started vomiting and was very restless. His pulse began to fail. Brandy, digitalis and strychnine were administered. At 7 p.m. on the 27th his general physical condition began to improve a little. His mental condition, on the other hand, shewed very great improvement. The patient talked quite sensibly and his manner, which had hitherto been abusive and aggressive, changed so that he became polite and quiet. Patient was treated with intravenous injections of cinchonine and quinine hydrochloride. *P. vivax* ring-forms appeared in blood smears taken daily from the patient up to 2nd June, when the temperature fell to normal and the ring-forms disappeared. He was then treated with Mist. Cinchonæ thrice daily for eight days and then twice daily for twenty-two days. During the last few days of May and the whole of June, the patient's mental condition improved rapidly although he lost 19 lbs. in weight during the attack. After that his physical state started to improve and his weight rose to 156 lbs. He has remained perfectly well, mentally and physically ever since, i.e., for seven months. In this circumstance it is doubtful whether there can be any reason to regard this case as one of general paresis but rather, one of acute confusional insanity.

Case 3.—F. A., Anglo-Indian, male, aged 45. Diagnosis: general paresis. Mental condition: considerable confusion and mental exaltation. Patient's chief occupation is "catching whales." Physical condition: All deep reflexes exaggerated. Superficial abdominal reflexes? normal. Plantar reflexes, flexor type. No Oppenheim sign. Pseudo-clonus. Speech definitely slurring. Tremors of hands, lips and tongue. Rombergism on bringing feet together. Gait ataxic. Pupils: faint and sluggish reaction to light. Consensual and sympathetic reflexes absent. Cerebro-spinal fluid: Wassermann reaction ++ in 6 M. H. doses; globulin increased: lymphocytosis: Fundi oculi:—discs normal.

This patient was put on to anti-syphilitic treatment shortly after his admission into hospital. He showed no improvement. He was injected intramuscularly with 1 c.c. of blood containing *P. vivax* ring-forms, on 9th May. On 20th May, the patient developed a temperature which was allowed to go untreated for eight days. The temperature never rose above 101°F. The blood examinations shewed:

On 20th May, no ring-forms.
On 21st and up to the 29th May, *P. vivax* ring-forms ++.
From 30th May to 12th June, *P. vivax* ring-forms and subtertian crescents+.

Weight before treatment 104 lbs. After treatment, 96 lbs.

No sort of improvement was observed in the mental condition of the patient. He died suddenly on 9th December of lobar pneumonia.

Case 4.—R. M. H., Anglo-Indian, male, aged 26. General nutrition good. Weight 124 lbs. Vacant expression of face. Tongue tremulous and coated. Wassermann reaction strongly positive. Patient would not permit an ophthalmoscopic examination to be carried out on him. Slight nystagmus in left eye. Superficial reflexes normal. Deep reflexes all absent. No Rombergism. No anæsthesia. In walking the patient jerked out his right leg and brought it forcibly to the ground. Speech: scanning, stuttering, slow and thick. Mental condition: dull and apathetic; does not speak except when spoken to and then not willingly. Dislikes to wear clothes. Takes no notice of his surroundings. Dirty in his habits. Diagnosis: psychosis with cerebral syphilis and ? tabes dorsalis. On 9th May, patient was injected intramuscularly with 1 c.c. of malaria blood containing *P. vivax* ring-forms. Patient developed a temperature on 20th May (103°F.). On the next day the temperature was normal. On the fifth day it rose to 104°F. Fever lasted until the eight day. The blood contained *P. vivax* ring-forms daily from the 20th to the 28th. On the 28th the ring-forms were very copious and the condition of the patient was very bad and in spite of every effort to save his life, he died on that day. Throughout the whole treatment with malaria the patient shewed no improvement in his mental state. Weight at the end of treatment 108 lbs.

Case 5.—E. W. F., Anglo-Indian, male, aged 44. Weight 140 lbs. A typical case of manic-depressive psychosis (melancholia). Injected intramuscularly with 1 c.c. of malarial blood on 5th August. On 22nd August, patient developed fever, 102.2°F. On the 28th the temperature rose to 105°F. From the 4th September the patient was treated with Mist. Cinchonæ for 30 days. No relapse of malaria. Mental condition quite unchanged until end of January when he began to improve. He is now (February) fit for discharge. Weight after malarial treatment 133 lbs. Present weight, 149 lbs.

Case 6.—A. W. F., Anglo-Indian, male, aged 37. A typical case of polyneuritic psychosis (Korsakow's syndrome). Admitted on 20th December, 1924. As patient shewed very little improvement under ordinary treatment he was injected with 1 c.c. of malarial blood intramuscularly on 24th September, 1925. On 7th October, the patient developed a temperature of 102.2°F. On the 9th the temperature rose to 102.8°F. After that day the temperature never rose above 99°F. until the 16th October when the patient was treated for his malaria with Mist. Cinchonæ for 30 days. No relapse. Mental condition shewed no improvement. He was discharged to the care of his wife. The escort who took him home reported that the patient's memory returned to him as soon as he reached home. On 6th December, 1925, the reply to our follow-up letter was very satisfactory. The patient had recovered and was applying for work on the railway. Weight before treatment, 172 lbs.: after treatment, 169 lbs.

Case 7.—J. W. T., Anglo-Indian, male, aged 17. Dementia præcox. Admitted 10th August, 1925. Patient was injected with malarial blood (1 c.c.) on 24th August, 1926. On 5th September he developed a temperature of 103°F. The blood shewed *P. vivax* ring-forms every day up to the 19th September when subtertian ring-forms appeared. The malaria was stopped at once with Mist. Cinchonæ. No relapse. Mental condition has remained quite unchanged. Weight before treatment, 107 lbs. After treatment, 104 lbs. Present weight, 118 lbs.

Case 8.—Mrs. K., Scots woman, aged 29. Admitted 31st May, 1923. Typical case of anergic stupor. On 4th August patient was injected intramuscularly with 1 c.c. of blood containing *P. vivax* ring-forms taken from another patient. No reaction followed. On 16th August she was injected with 2½ c.c. of Bass' culture of benign tertian malaria obtained from the Calcutta School of Tropical Medicine. On the 19th patient was seized with diarrhœa which was treated with bismuth and salol mixture. On the 21st patient improved but on the 24th diarrhœa again started. Diarrhœa and vomiting persisted during the next three days. On 28th patient had a slight rigor. *P. vivax* ring-forms were found in the blood on this day and on the following day. The blood examination on the 30th shewed *P. vivax* ring-forms in great abundance. On the following day, the patient collapsed. Pulse very feeble; clammy sweats; cramps in the legs; frequent vomiting. In spite of intravenous injections of quinine and the application of general restoratives, the patient died that evening. The blood examined shewed a copious development of *P. vivax* ring-forms. There were from two to three in every corpuscle. Specimens of the blood examined

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at the Calcutta School of Tropical Medicine were reported to contain, in addition, subtertian crescents. The whole course of the attack was quite afebrile. On the last day the temperature was subnormal.

Case 9.—Mrs. H., Russian Jewess, aged 33. Admitted on 24th May, 1923. Typical case of dementia præcox (katatonia). Patient was extremely negativistic. Would not speak; had to be fed and made to do everything. Refused to occupy herself; physical health good. On 15th September she was injected with ½ c.c. of blood containing only *P. vivax* ring-forms. On 23rd patient had a rigor with temperature of 103°F. On 25th patient had another rigor with a temperature of 101°F. Blood examination showed an abundance of B. T. ring-forms. On 30th the patient's condition was critical. Cold and clammy sweats; pulse very feeble; restless and vomiting; temperature subnormal. Patient was given 2 c.c. of hydrochloride of quinine intramuscularly. Patient improved slowly and after two months treatment she gained 20 lbs. in weight. With the improvement in her physical condition there was also an improvement in her mental state. She has now become a good worker. Eats and sleeps well. Says a few words occasionally and is clean in her habits.

Case 10.—Miss L., Anglo-Indian, aged 24. Dementia præcox. Patient was disorientated completely for time and place. Talks incoherently. Now and then violent and given to striking her own face with her fists and shoes. Also at times aggressive towards other patients. Was injected on 21st August with blood containing *P. vivax* ring-forms. On 4th September, she was admitted into the infirmary ward with fever preceded by a rigor. On the sixth day of the disease the blood films shewed for the first time subtertian crescents in addition to the *P. vivax* ring-forms which had appeared daily up to that time. She was at once put on Mist. Cinchonæ for a month and no relapse has occurred. Her mental condition has shewn no improvement.

Case 11.—Mrs. K., Anglo-Indian, aged 46. Admitted on 2nd August, 1925. Manic-depressive psychosis. On 8th September the patient was injected intramuscularly with 1 c.c. of malarial blood containing *P. vivax* ring-forms. No reaction took place. Patient's mental condition underwent no change.

Case 12.—Miss R., Anglo-Indian, aged 30. Admitted on 2nd October, 1922. Dementia præcox (katatonia). On 8th September patient was injected with 1 c.c. of malarial blood containing *P. vivax* ring-forms. No reaction followed. No change in the mental condition of the patient.

N.B.—The blood used on both these patients came from an Indian ward-boy and was fairly full of parasites. In both cases there was no reaction.

A rather remarkable feature of the treatment in two of these cases (Mrs. K. and Miss. L.) was the appearance of subtertian crescents from two to three weeks after the onset of the disease produced by benign tertian ring-forms. This phenomenon occurred also in three of the male patients thus treated. All these cases, except Mrs. K. were treated with blood drawn from another person, while Mrs. K. was given malaria from a culture made especially for the purpose by the Calcutta School of Tropical Medicine. The matter was referred to Major R. Knowles, I.M.S., for his view as to the possibility of the benign tertian having turned into subtertian. Major Knowles would not entertain such a suggestion for a moment.*

(4) *Treatment by endocrine substance:*

This particular type of treatment with endocrine substance combined with lymphoid compound tabloids, was suggested to me by my old teacher, Dr. J. Risien Russell, the eminent London neurologist. The treatment consists in giving thyroid (5 grs.) once daily in the early morning and lymphoid compound tablets with orchitic (or ovarian, as the case requires) extract; (two tablets, twice daily after the principal meals). This treatment is especially favourable with that type of individual first described by Stille as the "asthenic." The essential characteristic of this *typus asthenius* is, in a few words, a deficiency in thickness combined with an average unlessened length. This deficiency in the thickness development is present, according to Kretschmer, in all parts of the body—face, neck, trunk, extremities, and in all the tissues—skin, fat, muscle, bone, and vascular system throughout.

Case 1.—D. S. D., Anglo-Indian, male, aged 18. Admitted on 13th October 1925. Height, 5 ft. 2 ins. Weight, 90 lbs. Diagnosis: manic-depressive. On 2nd July, 1926, patient was put on treatment with endocrine substance. At that time he weighed only 80 lbs. In two months time the patient had improved very much. His weight increased to 107 lbs. and his mental condition was much improved. On 13th October he was discharged. Since then news has reached us that he is doing very well.

Case 2.—J. T., Anglo-Indian, male, aged 17 years. Admitted on 10th August, 1925. Height, 5 ft. 6 ins. Weight, 96 lbs. Diagnosis: dementia præcox. On 27th July, 1926, he was put on this treatment. In 73 days the patient increased in weight by 22 lbs. and from being very dull and apathetic he has become a good worker as a cobbler.

Case 3.—A. D. P., Anglo-Indian, male, aged 15. Admitted on 16th November, 1926. Diagnosis, imbecile. Weight, 72 lbs. Height, 5 ft. Patient extremely timid. Cries constantly for no reason. Treatment started on 23rd November. Continued for two months. Patient improved very much. No longer timid: does not cry: cheerful: has taken to working in carpenter's shop. Has increased 11 lbs. in weight.

Case 4.—L. E. I., Anglo-Indian, male, aged 14. Admitted on 10th May, 1926. Diagnosis; middle-grade imbecile. Height, 5 ft. 3 ins. Weight, 105 lbs. Put on treatment on 3rd July. Treatment continued for six weeks. There was no particular change in the mental condition of the patient beyond the fact that he became less quarrelsome than he had been when he was admitted. He lost 3 lbs. in weight during the treatment. This patient was not of the "asthenic" type at all and for this reason he may not have reacted as did the others treated in this way, who all derived considerable physical benefit from the treatment in that their weight increased considerably.

* One can almost certainly guarantee that the cultures sent were from an unmixed infection with *P. vivax*. It was thought that parasite-containing blood might not survive the journey to Ranchi from Calcutta. Accordingly cultures were taken. The donor's blood was examined in thin and thick films daily for one week before the cultures were taken, and no parasite forms other than those of *P. vivax* were found. Control cultures, taken at the same time, and kept in Calcutta to see whether those sent to Ranchi would be likely to be infective on arrival, showed a profuse growth of *P. vivax*; but none of *P. falciparum*. The donor's blood had been tested in the Imperial Serologist's department, and was completely Wassermann-negative. R. K.

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DIVERTICULITIS.

By LIEUT.-COL. SIR JAMES R. ROBERTS, C.I.E., M.B., M.S., F.R.C.S. (Eng.), L.M.S. (Retd.).

CONSIDERABLE work on this condition of diverticulosis has been done by Dr. E. I. Spriggs of Ruthin Castle, an establishment in North Wales for the treatment of diseases of the alimentary organs, both surgical and medical. This disease is characterised by a hernia, as it were, of the mucous membrane of the large intestine between the longitudinal muscular bands, giving rise to a number of pouches protruding under the peritoneal coat, their interior communicating with the lumen of the intestine. The pouches are either apple-shaped or pear-shaped, so that the orifices are either open or narrowed; these diverticula are filled with intestinal contents and as a rule are easily permeable by bismuth or barium given for radiographical purposes, and also to liquid paraffin. The disease is marked by three stages:—

(*a*) A pre-diverticular stage, when the edge of the barium shadow showing the affected intestine is marked by an almost ragged margin;

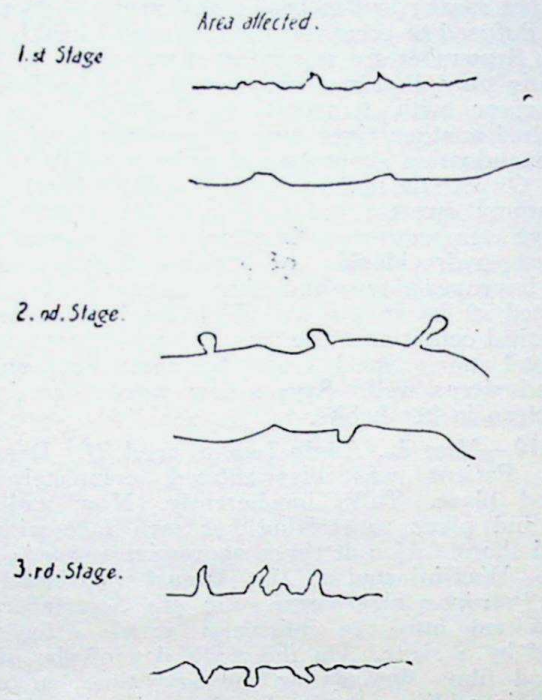
(*b*) a stage in which the protuberances are well marked, showing the two shapes referred to above;

(*c*) a stage in which, owing to the irritation, a thickening and fibrosis of the intestinal wall and peritoneum takes place, giving rise often to a definite tumour, and in a few recorded cases so hard as to be mistaken at the operation, before microscopical examination, for a malignant growth. At this stage a narrowing of the lumen of the gut occurs, and intestinal obstruction may result, requiring a colostomy, or an excision of the affected portion with an anastomosis (end to end, or lateral), if the affected area be in a portion of the colon admitting of this latter procedure. The diverticula in this third stage become altered into spikey protuberances involved in the fibrous growth and thickening.

Diverticulitis is a disease of age, occurring generally after 50 years of age, most cases being in persons about 60, and it is more frequent in males. The most frequent site is in the sigmoid flexure (pelvic colon) and in that portion where it forms a downward bend, and where the fæces lodge for some time before being emptied into the rectum. This area is pointed out by Dr. Spriggs, and the frequency with which this portion is affected may be explained by its "cesspool" function.

It has been pointed out that the disease occurs in the "fat, flabby, and flatulent" but this is not Dr. Spriggs' experience over a large number of cases, the majority being spare men. Associated as it is with flatulence, it is less often associated with constipation, rather than that loose stools are of more or less frequency in the condition.

From the above it can be inferred that diverticulosis is a chronic condition giving rise to general ill-health, some varying amount of pain, dyspepsia in the general sense, and flatulence, and it is as well to remember that it can be the cause of an "acute abdomen." The diagnosis has to be made by *x*-rays and the opaque meal, and it is very important to remember, as Dr. Spriggs has pointed out, that a photo must be taken after the meal has passed out through



the rectum, when the diverticula will be seen still filled with the barium, like a row of beads along the colon position in the picture. The material may remain in the diverticula for weeks or even months and show a shadow on the plate taken long after the meal has been administered. The barium or bismuth must be given in milk, or lactic acid milk, but not in a starch medium as this gives rise to slow progress through the colon, and to flatulence at times. From the above it is obvious that stasis in the diverticula is the most serious aspect of this condition, and is likely to be untouched by ordinary aperients. Liquid paraffin, however, seems to penetrate easily into the pouches, and it is the association of this with other aperients that is indicated in the treatment of the disease.

Attempted diagnosis by the sigmoidoscope is useless, as the condition is beyond its reach; although present in the sigmoid, it is rarely limited to this portion of the colon.

It will be of some interest to see, now that *x*-ray outfits are numerous in India, whether diverticulitis is prevalent in India. The largely starchy diets in India and their attendant flatulence may give rise to a crop of cases, which hitherto have been passed over undiagnosed, or have been classed as flatulent dyspepsias. One word of warning; the concertina-like folding and projections in shadows of normal colons on *x*-ray plates are not to be mistaken for diverticulitis. The latter is characterised by definite and limited apple-shaped or pear-shaped protuberances, or the spiked ones of the third stage.

There is an interesting connection between diverticulitis and spondylitis of the spine as well

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as left-sided sciatica, the frequency of which has been recorded. The probable explanation is that it is the mesentery of the sigmoid flexure and descending colon which are especially attached to the left of the spine, and these contain the lymphatics which in the case of disease of the portions of bowel above-mentioned are likely to spread a fibrositis to adjacent structures. Here then is an explanation of a certain number of cases of chronic lumbago and sciatica in old persons.

THE CAUSATION OF CYSTITIS.*

By GANAPATI PANJA, M.B.,
Assistant Professor of Bacteriology,
and
KALIPADA BANERJEE, M.B., D.T.M.,
Assistant Professor of Pathology, Calcutta School of Tropical Medicine & Hygiene.

THE popular view is that cystitis is most commonly due to an invasion of the bladder by the *Bacillus coli* which enters the organ by the urethra from the gut or through neighbouring adhesions of the gut to the vesical wall.

Our findings show that *Bacillus coli* is not the most common cause of cystitis. We collected in sterile test tubes 44 samples of urine with aseptic precautions, mostly from our hospital cases by means of catheters: 5 c.c. of each sample was put into 10 c.c. of McConkey's broth and 5 c.c. into 10 c.c. of glucose broth of pH 7.6 and incubated. McConkey's broth was used for the cultivation of lactose and non-lactose fermenters, and glucose broth for streptococci and staphylococci. Later in our examinations, instead of glucose broth, we put the urine itself in the incubator and looked for flakey growths of streptococci after 24 hours. After 24 hours' cultivation, the culture on McConkey's broth was then plated on McConkey's bile salt lactose neutral red agar, and the growth on glucose broth was plated on glucose Conradi media. The colonies obtained on these plates were examined morphologically and then identified by their sugar reactions. The idea of using 10 c.c. of urine in these two media, and the enrichment by cultivation in the urine was to demonstrate the possibility of the presence of all kinds of organisms, however few they might be. The following is a list of the organisms isolated:—

Non-lactose fermenters.		*Lactose fermenters.*	
B. asiaticus	4	*B. coli communis*	4
B. proteus	2	*B. pseudo-coli*	2
B. fæcalis alkaligenes	2	*B. colo-tropicalis*	2
		B. cloacæ	1
TOTAL	8	*B. acidi lactici*	9
		B. venkanda	3
		B. metadiffluens	1
		B. meta-dysentericus	2
		B. entericus	1
		B. paræntericus	1
		B. lactis ærogenes	1
		Streptococci	10
		TOTAL	37

These are all gut organisms and it is interesting to note that *B. acidi lactici* is the commonest offending bacillus found. The mode of invasion of the urinary bladder occurs as follows:—

(*i*) It may occur as the result of a septicæmia in which either the organisms are simply eliminated in the urine without producing any cystitis, as for example, in typhoid and paratyphoid fevers, or the organisms during elimination may cause definite cystitis. One of our cases, Mrs. B., was suffering from a septicæmic type of fever without any urinary trouble and *B. asiaticus* was isolated twice from her urine. Another case, a young boy, was suffering from a typhoid-like fever without any urinary trouble and *B. fæcalis alkaligenes* was isolated both from his blood and urine.

(*ii*) The invasion may occur as a result of emboli from the intestines, due to some intestinal disease-enteritis as in epidemic dropsy, mucous colitis, chronic dysentery, sprue, etc. In helping Colonel Acton and Major Chopra in their work on epidemic dropsy we isolated streptococci from the urine of some of the cases. There were no signs or symptoms of cystitis and the streptococci were probably derived from the gut, the mucous membrane of which gets damaged by the toxins of epidemic dropsy and thus gives easy access for the streptococci into the blood stream. Similarly in other intestinal diseases, the state of the mucous membrane plays an important part in the invasion of the blood by toxins and organisms. It was also found that more than one type of organism was isolated from the urine of a case on repeated examinations, indicating thereby that a leak in the gut may give access to the blood stream to more than one type of organism. This finding is very important from the point of view of treatment, as we shall see later. Infection of the bladder as well as of other tissues may occur at the same time, as a result of septicæmia. In one of our cases, a mammary abscess was present and *B. proteus* was the cause.

(*iii*) The organisms may be derived from some pelvic inflammation and may invade the bladder by migration through the lymphatics: our experience regarding this is limited.

(*iv*) The invasion may occur through the urethra, especially in females. In some of our elderly female patients suffering from diabetes and in cases in which *B. acidi lactici* was found in the urine, this mode of infection is possible. In pregnancy, infection by *B. coli communis* may occur by the urethra.

TREATMENT.

A course of autogenous vaccine treatment was given to most of our cases and the result was satisfactory. Vaccines may fail if the following points are not attended to:—

(*i*) The infection of the gut, however slight, must be tackled. Stools should be repeatedly examined and protozoa like *Entamœba histolytica* should be eliminated by adequate injections of

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emetine and administration of stovarsol or yatren, etc. Autogenous vaccines of Monilia, or Flexner, or Shiga bacilli, etc., should also be injected if the patients are suffering from bacillary dysentery.

(*ii*) The resistance of the patient must also be increased by tonics, thyroid administration and proper nourishment.

(*iii*) Hypersensitiveness to injections of vaccine should also be considered. In one of our cases suffering from pyæmic mammary abscesses and cystitis, injections of an autogenous vaccine of *B. proteus* (although sterile), produced a local abscess every time a large dose was given, and the pus showed the presence of *B. proteus*. We had to cut down the dose of the vaccine to the utmost limit.

(*iv*) The possibility of the presence of multiple infections must also be thought of. Hence it is necessary to examine the urine several times. It has been found in some of our cases that an autogenous vaccine of one organism isolated gave moderately good results but did not cure; a second culture was then made and a different organism was isolated; when this was added to the original vaccine, a complete cure then occurred.

Our grateful thanks are due to Lieut.-Col. H. W. Acton, I.M.S., for his kind help, without which this paper would have been impossible.

THE PRODUCTION OF ORIENTAL SORE IN MAN BY FLAGELLATE CULTURE OF *LEISHMANIA TROPICA*.*

By GANAPATI PANJA, M.B.,

Assistant Professor of Bacteriology, Calcutta School of Tropical Medicine & Hygiene.

A WEEK-OLD flagellate culture of *Leishmania tropica* on NNN medium was obtained from Dr. B. M. Das Gupta, Assistant Professor of Protozoology, School of Tropical Medicine and Hygiene, Calcutta. The culture was made from a typical case of oriental sore and was found to contain numerous living flagellate forms of *Leishmania tropica*.

Mahammad Elias, a Mahommedan male, aged about 30, of average build and health, came voluntarily for inoculation. He is an inhabitant of the Midnapore District of Bengal, but had been living in Calcutta for the last 15 years and was a building contractor by occupation. The back of the volunteer's shoulder was selected for inoculation, as it was under the clothes and covered by the shirt. The skin was sterilised with tincture of iodine and washed with absolute alcohol. A hypodermic Record syringe was sterilised in olive oil at 140°C, cooled, and then filled with 1 c.c. of the culture of *Leishmania tropica* from the water of condensation of the NNN medium. This fluid was then injected *intracutaneously* over an area of about ¾th of an inch diameter on 15th August, 1925. A week later the man was examined and the inoculated area was found normal in appearance. A second injection was given as above at the same spot with a week-old culture. A very small nodule developed in about three weeks at the site of inoculation; otherwise the man was in perfect health. The nodule persisted, but gave no trouble except that it was slightly itchy. The volunteer went to Kathiawar on 1st May, 1926, i.e., about 8½ months after the inoculation. The nodule enlarged and ulcerated after a further 3 to 4 months, i.e., a year later, when in Kathiawar. The man then came back to Calcutta. The ulcer was about the size of a rupee and was situated exactly at the site of inoculation. It was elevated and showed a red granulomatous base. The margins were irregular and crusty, and showed radiating dilated lymphatics of pinkish colour. Slight pain was present, and the lymphatic glands of the corresponding side of the neck were enlarged. The surface of the ulcer was scraped and serum exuded freely.

A smear was made on a clean slide with the serum and stained with Leishman's stain. A large number of *Leishmania tropica* parasites were found.

The patient was treated with carbon-dioxide snow, applied twice a week, and cured in about a fortnight's time.

My object in writing this paper is to show that it is possible to produce oriental sore in man by intradermal injection of the flagellate culture of *Leishmania tropica*; as far as I am aware this is the first time that this experiment has been carried out by anyone. The flagellate forms of *Leishmania tropica* are usually regarded as non-infective, but the above result disproves this. The points of interest are (1) the incubation period, lasting about three weeks, and the continuance of the lesion for a year; (2) the mode of inoculation, namely, *into* the skin and not into the deeper structures.

One objection may be raised, and that is that the patient developed the ulcer in Kathiawar, where oriental sores are by no means uncommon. But the points against this are that there was a definite nodule before the patient went to Kathiawar, that ulceration took place precisely at the site of inoculation, and there was no ulcer on any other part of the body, and that the site of the ulcer was one uncommon for oriental sore, being kept covered by clothing during the greater part of the day and night.

My thanks are due to Lieut.-Col. H. W. Acton, I.M.S., for his kindly helping me to write this paper.

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A SIMPLE METHOD FOR ESTIMATING THE AVAILABLE CHLORINE IN BLEACHING POWDER.

By B. B. BRAHMACHARI, D.P.H.,
Director of Public Health Laboratories, Bengal.

BLEACHING powder is being used in increasingly large quantities by local authorities as well as by mills for purification of the water of tanks and wells and of water-works. The powder, however, is unstable, and it is rare in this climate to get it at its standard pharmacopœai strength of 30 per cent. of available chlorine. So far as disinfection of tanks and wells goes, the uncertainty of the strength may be met by making a preliminary test with the powder on a small quantity of the particular water to be treated and thus finding out the quantity of the former that will leave an excess of free chlorine in a definite quantity of the latter. But it is equally necessary that the purchasers should know the potency of the bleach when compared with the price they pay for it. The regular chemical tests for it can be carried out only by the chemists in properly equipped laboratories. Hence I was requested by Mr. Dallas, Inspector of Septic Tank Installations, Bengal, to work out a simple method for estimating the available chlorine in bleaching powder which would require no special technical skill, so that it might be applied by the doctors of the mills in their own dispensaries.

Modification of the As_2O_3 method—A simple modification of the arsenious oxide method of valuation of bleaching powder will meet the requirements quite satisfactorily. In this process the chlorine of the molecule of calcium chlorhypochlorite is left in stable combination with calcium as calcium chloride, while the oxygen of the hypochlorous radicle goes to oxidise the arsenious oxide into arsenic oxide; the equation being

$$2\,Ca\begin{matrix}\diagup Cl\\ \diagdown OCl\end{matrix} + As_2O_3 = As_2O_5 + 2\,CaCl_2$$

so that each molecule of the trioxide oxidised is equivalent to two molecules of available chlorine fixed into the calcium chloride.

As 142 grm. of Cl_2 = 198 grm. of As_2O_3
1 grm. of Cl_2 = 1·39 ,, ,, ,,
7 grains of Cl_2 = 0·75 grains of As_2O_3

Requirements.—All that is necessary for the dispensary doctor for the proposed test will be:—

(1) A bottle of the arsenious and sodium carbonate solution to be prepared as below—

Acid arsenious	..	10 grains.
Sodium carbonate	..	40 ,,
Aqua destillata	..	16 ozs.

Grind the arsenious oxide into a fine powder, put it into 8 ozs. of the water; add the 40 grains of sodium carbonate (not bicarbonate); gently warm the mixture, shaking continuously till all the arsenious oxide is completely dissolved. Now add water to 16 ozs. Then 1 c.c. of the solution = 1.39 milligrams of As_2O_3 = 1 milligram of Cl_2.

(2) A rack holding 6 test tubes.

(3) A 1 c.c. pipette will be convenient but not indispensable, 15 minims from a minim glass being equal to 1 c.c.

(4) Starch.

(5) Potassium iodide.

Procedure.—Prepare starch solution by boiling starch with water in a test tube; weigh out 7 grains of the bleach; emulsify it in 16 ozs. of distilled water (or tap water if it is organically pure and has no free chlorine added to it in the process of purification). The weighed-out powder should be ground first with a small quantity of water, the remaining water should then be added gradually with shaking so that the emulsion may be uniform.

1 c.c. of this emulsion = 1 milligram of the bleaching powder.

Put one drachm of water as above into each of 6 test tubes; add 1 c.c. of the reagent to each.

Now add 3 c.c. of the bleaching powder emulsion into the first test tube; 4 c.c. into the second; 5 c.c. into the third; 6 c.c. into the fourth; 8 c.c. into the fifth; and 10 c.c. into the sixth. Shake each of the test tubes well. Next add a crystal of potassium iodide and a few drops of freshly prepared starch solution to each.

Excess of available chlorine over that used up in the reaction for oxidation of the arsenious acid will be shown by the formation of blue iodide of starch. The result may be interpreted from the following table:—

Least quantity of bleaching powder emulsion giving a blue colour.	Available chlorine in the sample.	
	Less than.	More than.
3 c. c.	..	33%
4 c. c.	33%	25%
5 c. c.	25%	20%
6 c. c.	20%	16½%
8 c. c.	16½%	12½%
10 c. c.	12%	10%

If not blue even with 10 c.c. of the emulsion, the powder has less than 10 per cent. of available chlorine.

If the available chlorine is 25 per cent. or over, the bleaching powder is of satisfactory quality.

Precautions.—The test tubes and pipette or measuring glass used in the analysis should be thoroughly washed. The potassium iodide used should be pure, it should contain no yellow liquid, and it should give no blue colour by itself in starch solution.

The reagent is highly poisonous, and the same precautions should be taken with it as when it is used as a drug.

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Recently bleaching powder has been placed on the market containing 66 per cent. of available chlorine; 1½ c.c. of the emulsion will give the blue colour in such cases, while 2 c.c. of the emulsion giving the colour will indicate a chlorine value of over 50 per cent.

THE INCIDENCE OF INTESTINAL PARASITES IN A CALCUTTA HOSPITAL POPULATION.

By DHRUBA MOHAN CHATTERJI, M.B.,
Clinical Pathologist, Medical College Hospitals, Calcutta.

UNDER instructions from Lieut.-Col. H. B. Steen, M.D., M.S., I.M.S., a routine examination of the stools of all patients admitted to the surgical wards of the Calcutta Medical College Hospitals was carried out by me, and the results may be of some interest. They show the percentage of patients harbouring intestinal parasites in an average hospital population in Calcutta—the cases being quite unselected. The incidence of intestinal infections is so high that it clearly shows that treatment for such intestinal infections should be part and parcel of the routine treatment of all hospital patients in India, and such patients' health would probably be much improved by measures directed against intestinal parasitic infections from which they are suffering.

In all, the stools from 371 patients were examined during 1925-1926. The findings which resulted were as follows:—

TABLE I.—*General Findings.*

Ankylostoma ova in 43 specimens ..	or 11.6%
Ova of *Trichuris trichiura* in 11 specimens ..	or 3 %
Ova of *Tænia saginata* in 2 specimens ..	or 0.5%
Ova of *Ascaris lumbricoides* in 20 specimens	or 5.4%
Ova of *Hymenolepis nana* in 5 specimens ..	or 1.3%
Ova of *Oxyuris vermicularis* in 3 specimens	or 0.8%
Trichomonas hominis in 23 specimens ..	or 6.2%
Chilomastix mesnili in 5 specimens ..	or 1.3%
Lamblia intestinalis in 14 specimens ..	or 3.8%
Endolimax nana in 17 specimens ..	or 4.6%
Entamœba histolytica, or its cysts, in 12 specimens	or 3.2%
Entamœba coli, or its cysts in 20 specimens ..	or 5.4%
Iodamœba butschlii in 1 specimen ..	or 0.3%
Strongyloides larvæ in 7 specimens ..	or 1.9%

TABLE II.—*Classification by Caste and Sex.*

Total number of stools examined of Hindus was 193: of these, the number of positives, i.e., those which show some sort of parasites or ova was 87	or 45.1%
Total number of stools examined of Mahomedans was 68: of these the positives were 28	or 41.2%
Total number of stools examined of Europeans was 98: of these the positives were 23	or 23.5%
Total number of stools examined of other castes was 3: of these only 1 was positive	or 33.3%
Total number of stools examined of male patients was 304: of these the positives were 119	or 39.1%
Total number of stools examined of female patients was 60: of these the positives were 20	or 33.3%

TABLE III.—*Age Distribution of Findings.*

Of the total number of positive stools, the number within the 1st decade was 7 ..	or 5 %
Of the total number of positive stools, the number within the 2nd decade was 24 ..	or 17.3%
Of the total number of positive stools, the number within the 3rd decade was 44 ..	or 31.7%
Of the total number of positive stools, the number within the 4th decade was 41 ..	or 29.5%
Of the total number of positive stools, the number within the 5th decade was 14 ..	or 10.1%
Of the total number of positive stools, the number within the 6th decade was 5 ..	or 3.6%
Of the total number of positive stools, the number above 60 was 1	or 0.7%
Between the ages of 20 and 40, total number of positives was 85	or 61.2%

THE EFFECTS OF BEE VENOM.

By A. BAYLEY DE CASTRO,
Junior Medical Officer, Port Blair.

UNDER the above title Dr. A. R. D'Abreau has an article in the *Indian Medical Gazette* for November 1926, and as a few very striking cases have come under my personal observation, I am publishing this note.

The species generally credited with evil effects is *Apis mellifica*. L. Brant and Ratzeburg were the first to study bee venom in 1833. Paul Bert in 1865 and Carlet in 1884 also studied it, but it was not till 1897 that the chemical nature of the poison was carefully studied by Langer.

This poison when freshly extracted is a transparent acid fluid with a bitter taste and an aromatic smell. The acid reaction is believed to be due to formic acid.

Langer's experiments show that the active principle is not an albuminous but an organic base.

The poison is destroyed, or its activity lessened by the action of oxidizing agents.

Castellani and Chalmers (2nd edition) write "Intravenous injections into dogs produce convulsions, trismus, nystagmus, emprosthotonus, death from respiratory failure. This action is believed by some authors to be due to a neurotoxin, but the blood after death is very fluid, and the red corpuscles are destroyed, indicating a marked hæmolysis, while all the organs except the spleen show hæmorrhage and hyperæmia, so that the effect may not be due so much to the action on the nervous system, as to that on the blood. With regard to the hæmolytic action Morgenroth and Capri have shown that there is a similarity between this poison and cobra venom."

The constituents of this poison are:—

1. An inflammatory poison, said to be derived from the acid gland.
2. Neurotoxins; (*a*) convulsive, (said to be derived from the alkaline gland); (*b*) narcotic, (secreted by the acid gland).
3. Hæmolysins.

Let us now for a moment study the poison apparatus of a bee.

From the posterior end of the abdominal segment projects a chitinous sheath which contains

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two barbed darts which form the sting. Into this sheath and connected with the darts two (sometimes three) ducts from glands open. The principal duct belongs to the acid gland and opens anteriorly into a sac which is a reservoir for the poison and which leads to a slender coiled tubular gland which may be bifid or even divided into three. This is a very long gland ramifying amongst the contents of the abdomen. The second opening belongs to a small irregular tubular gland called the alkaline gland, or gland of Dufour.

Now bearing in mind that different trains of symptoms are caused as the result of stings, I think it is safe to infer that the two darts can be used independently of one another. When on the other hand a bee is very angry and attacks with force, both darts are used and the full amount of poison possible for ejection is injected. It should also be remembered (at least this is my idea), that all the bees which apparently attack one do not sting, but the majority generally settle for a second or so and then fly off.

The following cases will I hope illustrate my points :—

Case 1.—In September last an elderly woman in the female ward was stung by a bee at the external canthus of the left eye one afternoon. The Sub-Assistant Surgeon who happened to be in the ward at the time reported that the bee deliberately attacked this patient and would not be driven away until it had stung her. In about an hour's time there was a considerable amount of swelling and ecchymosis over the forehead, left temple, left side of the face, and both eyelids were puffy. At first sight the patient presented the appearance of erysipelas. There was a great deal of pain, a rise of temperature to 101°F. and a pulse of 112 per minute. By next morning all the physical signs had greatly diminished and by evening there was no need to consider this part of the patient's illness.

Case 2.—A few days after this occurrence, my wife, son and myself were sitting in the garden, when my son was stung on the back of the neck; but all that happened in his case was the formation of a little lump (nodule) and a slight red blush about 2 inches in circumference, and this all disappeared in a couple of hours.

This bee did not make a determined attack.

Case 3.—In December 1917 when we were encamped on the Rouvouma River in Portuguese East Africa, a swarm of bees one morning attacked the camp, and "M," a young chemist who had only recently joined us as a dispenser from Scotland, was most furiously set upon. Some hundreds of bees at a time settled on his head, face, neck, and hands. He became frantic in his endeavours to drive them off and in fact, fright and pain were soon followed by exhaustion, and later on by a good deal of collapse.

In about 3 or 4 minutes the bees had all flown away, and then we extracted about 40 or 50 stings from "M" mostly from the back of the neck. The face, neck and scalp soon became very red and swollen, and later on a slight œdema was noticed.

This stinging had taken place at 9 a.m. and by 2 p.m. "M" had a temperature of 102°F. and complained of a constricted feeling in the head. During the day he had one or two loose stools, which I attributed to fright as he was a very nervous man. Next morning he felt a "bit cheap," the neck still showed a slight swelling, but by evening this had gone and he felt quite fit.

Judging from the number of bees that settled on this man, the number of broken stings we found, his method of knocking them off and, finally, the symptoms of poisoning he exhibited, I do not believe that less than one-eighth or more of the bees that settled on him, stung him.

I had often been told that if a swarm of bees are around and you happen to be their line of flight just stand perfectly still and quiet and they will not attack, while the moment you start driving them off by swinging your arms about, the stinging begins, and this was amply proved in this instance. I was not more than four yards away from "M" when the bees were flying past and I just shouted out to him to keep still and then remained quiet and motionless. Innumerable bees came around me and some actually settled on me and though the temptation to drive them off was great, I did not do so but waited for them to go off on their own, while "M" on the other hand completely lost his head, with the result that the bees soon concentrated all their energies on him.

Case 4.—Another instance occurred one afternoon under the Kosi Bridge a few miles out of Kursala in the Bhagalpore District in January 1919. A party of us were in butts scattered along a wide strip of sand awaiting the return of demoiselle cranes from the fields. No one had informed us that there was a huge beehive under the bridge, and "K" of the Police had his butt not more than 30 yards away from this. As the cranes came sailing past a regular *feu de joie* started, but very soon gave place to most awful yells from "K." He was soon racing across the strip of sand to the river with a thick swarm of bees about, around, and behind him. Seeing his plight, one of the party to divert the attention of the bees fired a charge of small shot into them and at the same time got his gun boy to throw as much sand as possible into the air about 10 or 15 yards away from him. I do not know the virtue of this procedure but it certainly had the desired effect, for almost immediately the bees left him and few back to the hive.

Now comes the interesting point. "K" had one sting on the forehead but from the back of the neck to over the occipital region he must have had fifty or more, (I am writing from memory).

The back of the neck is for some reason a specially selected site for stinging. It may be that when attacked one "ducks" one's head to protect the face and eyes, but this by no means affords a full explanation.

The tsetse fly also selects the back of the neck and the popliteal space.

"K" complained of a burning sensation and a certain degree of vertigo. In a short time the affected area was swollen, red and hot, but "K" was as hard as nails and no further symptoms developed.

A SILVER METHOD OF STAINING *LEISHMANIA DONOVANI* IN THE TISSUES.

By CHARU CHANDRA BASU, B.A., M.B.

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It is somewhat difficult to demonstrate Leishman-Donovan bodies in post-mortem material. The organisms lose their staining properties a few hours after the death of the patient. If one is fortunate enough to get hold of good material, successful demonstration of these parasites in the tissues is not a difficult matter. De(1) has been successful in staining them by Leishman's method. He fixes small blocks of tissues directly in acetone, and embeds them in paraffin. The sections are stained with Leishman's stain, differentiated in acetone, and cleared with xylol. The sections are beautifully stained, but the stain fades after a time.

Meleney(2) working on the histopathology of kala-azar in the hamster, monkey, and in man, recommends hæmatoxylin stain. He fixes the

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tissue in Zenker's fixative and stains with Harris's hæmatoxylin. The advantage of this method of staining over the Leishman method is that by this method not only are the parasites stained, but one can also form an idea of the histology of the tissue.

While studying the reticular tissue formation in the spleen and liver of kala-azar cases by the silver impregnation methods, I noticed that silver solutions stained the parasites very well. The best results were obtained by the Bielschowsky-Cajal process as modified by Gorriz.(3) The actual method followed was as follows:—Tissues were secured as soon after death as possible, made into small cubes, and fixed in 10 per cent. formol (neutralised with chalk). Sections were cut by the freezing method. They were next mordanted for 4 or 5 minutes at 50°C. in an ammonium bromide formol solution; (water 50 c.c., formol 6 c.c., ammonium bromide 3 grm.). The sections were next passed through two changes of distilled water and transferred to a silver bath, consisting of distilled water 6 c.c., pyridine 1 drop, and Bielschowsky's silver oxide solution 3 c.c. This bath was warmed to 45°C. and sections kept in it until they became light brown. They were next reduced in formol, washed in distilled water, toned in gold chloride solution for 15 minutes, fixed in 5 per cent. thiosulphate solution for a few seconds, washed, dehydrated in alcohol and cleared in carbo-xylol and mounted in balsam. By this method the reticular tissue was very well brought out and the micro- and macro-nuclei of the Leishman-Donovan bodies were well stained. The organisms are best seen by artificial light with a 1|7th oil-immersion lens and No. 12 compensation ocular.

The advantages of this method are that (*i*) the leishmania can be demonstrated in tissues preserved in formol; (*ii*) the staining is permanent; (*iii*) the sections demonstrate the increase in reticular tissue, one of the most important features in the histopathology of kala-azar.

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EPIDEMIC DROPSY AT SANDWIP.

By SARASI LAL SARCAR,
Civil Surgeon, Noakhali,
and
BRAJENDRA MOHON GUPTA,
Health Officer, Noakhali.

SANDWIP is an island situated in the Bay of Bengal about 25 miles from Chittagong. An outbreak of epidemic dropsy being reported in this island, which is cut off from communication with the mainland on all sides, the Civil Surgeon requested the District Health Officer and also the Director of the School of Tropical Medicine, Calcutta, to send workers to investigate the disease. Accordingly an investigation was carried out by the two authors of the paper and Dr. B. K. Paul of the Calcutta School of Tropical Medicine.

Altogether 35 persons were found to be suffering from the disease. A detailed examination was carried out in five families and it was found that out of a total number of 31 members only 3 escaped the disease. The latter were of the ages of 2, 3 and 6 years. The first two lived almost exclusively on milk; in the case of the child 6 years old the disease was probably not noticed. In another family, consisting of a large number of members, only one case occurred. This man used to take a different kind of rice (Rangoon *atap*), from the rest. The cases were of a mild type. Excepting the sweepers, who left the place, all the affected persons made an uneventful recovery within a week or two. The rash in the skin was not marked in this series of cases.

The study of the epidemiology of the disease at Sandwip was of peculiar interest inasmuch as Sandwip is a very fertile tract, where milk is very cheap, vegetables can be got in abundance and it is not a place where one would expect deficiency diseases or want of sufficient vitamines in the food materials. Moreover, it is a rice producing country, producing a sufficient quantity for local consumption and there is no mill to subject the rice to milling processes.

The following facts are of interest regarding the epidemiology of the disease.

All the cases of epidemic dropsy were found located in the town of Sandwip and its suburbs, the foci of infection being not more than 1½ miles apart from each other.

From the middle of August to the end of August there were 30 inches of rainfall. The heaviest rainfall for the year was during the week 30th August to 5th September, 1926. The outbreak of epidemic dropsy began soon after that. The respective amounts of rainfall were as follows:—

30th August	.. 1·30	inches.
31st August	.. 6·60	,,
1st September	.. 2·15	,,
2nd September	.. 3·20	,,
3rd September	.. 1·90	,,
4th September	.. 2·15	,,
5th September	.. 0·35	,,

During the time of our visit the climate of the place was markedly hot and moist.

We inspected the conditions of the local godowns in the markets and the storage of

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Table showing the result of examination of cases.

Family.	Race and Religion.	Sex.	Total members.	Members affected.	Dates of incidence.	Oedema.	Knee-jerks, Fever and No. of cases.	Heart condition.	Alimentary system.
1	Hindu ..	M 5 F 2	8	7	6-9-26 (1) 10-9-26 (5) 15-9-26 (1)	Slight, 4 Moderate, 1 Marked, 2	Increased 3 2/7 Normal 3 Lost 1	Dilated 1 Normal 6	Constipation 5 Normal 1 Diarrhœa 1
2	Hindu .. 1 Muhammadan servant.	M 3	3	3	5-9-26 (1) 8-9-26 (1) 10-9-26 (1)	Slight, 3	Increased 1 Nil Normal 2	Normal 3	Constipation 1 Normal 2
3	Muhammadan	M 3 F 2	5	5	26-8-26 (1) 13-9-26 (1) 15-9-26 (2) 20-9-26 (1)	Slight, 3 Moderate, 2 Marked, 1	Increased 1 Nil Normal 2 Two females did not permit examination.	Normal 2 Weak sounds 1	Constipation 1 Normal 2
4	Hindu ..	M 3 F 2	5	5	1-9-26 (2) 15-9-26 (3)	Slight, 3 Marked, 2	Normal 5/5	Palpitation 1	Diarrhœa 2 Constipation 3
5	Hindu ..	M 3 F 5	10	8	1-9-26 (1) 4-9-26 (2) 5-9-26 (4) ? (1)	Slight, 4 Moderate, 4	Normal Nil	Normal	Normal 7 Constipation 1
	Seven other cases were examined belonging to five different families.								
	Hindu .. Muhammadan	M 5 M2	..	..	7-9-26 (1) 13-9-26 (2) 14-9-26 (3) 16-9-26 (1)	Slight, 2 Moderate, 3 Marked, 2	Increased 7 3/7	Palpitation 3 Dilatation 2 Normal 2	Normal 4 Diarrhœa 2 Constipation 1
	No rash in the skin was discovered in any of them.								

rice in them. In none of the local godowns are the floors pucca. There are bamboo-platforms in all the shops and the rice is generally kept stored on these platforms. But the gunny-bags containing rice, for want of space on the platform, are very often kept direct on the ground. The godowns are as a rule tin sheds, the interiors of which are easily liable to get hot and the roofs are often leaky in places. They have a damp floor, especially during the excessive rains. The following are some of the details of the sources of rice-supply regarding the different households affected.

With regard to families Nos. 1 and 2 in the above table, the supply of rice came from Barisal direct in quantities sufficient for one month's consumption. As far as we could ascertain, epidemic dropsy was raging at Barisal about this time. So it is likely that in these cases the infection came from Barisal.

Regarding family No. 3 the inmates were using country rice, but this rice was kept stored in dark and ill-ventilated rooms. The rice was stocked in bamboo baskets which were placed upon bamboo-platforms about 2 feet above the ground. The baskets were kept in corners of the room and on inspection it appeared probable that the rice was liable to get soaked and damped with rain water trickling down the leaky thatched roof and *tarja* wall of the room during heavy rain.

In another household the owner of the house used rice from paddy stocked in his own house and stated that he was in the habit of preparing fresh rice from his paddy in small quantities sufficient for 3 or 4 days' consumption. The paddy was also said to be fresh and was husked only very recently. On examination, both the paddy and the rice looked damaged. On questioning it was ascertained that during the time of storing the paddy, there was a heavy rainfall, and that before storing, the paddy could not be properly dried. The husk of the paddy and the aleurone layer of the rice were found to be damaged and the rice presented the appearance of being infected, as there were white spots in many of the grains.

The inmates of all the houses affected were using either Barisal or Rangoon rice, except household No. 5. The people in general who were unaffected were using coarse rice of local production. On close investigation we found many people using Rangoon rice or Barisal rice remaining unaffected; but these have not stocked their rice but buy the rice from different dealers in small quantities for 2 or 3 days' consumption at a time.

Weevils were absent in most of the specimens of rice examined. Another interesting point we were able to ascertain was that the gunny-bags which had been used for bringing Barisal rice had been used in some cases for stocking country-made rice. This has happened in some families, including No. 5, the inmates of which are using local rice, yet have been affected. Now we may suppose that epidemic dropsy is caused by some micro-organisms such as pathogenic fungi infecting rice. These micro-organisms develop in a moist condition of the rice, when the temperature

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is comparatively high. When the rice is stored under such conditions as to exclude sunlight and air it favours the growth of such organisms. Moreover, the organisms adhering to the gunny-bags and thus infecting the rice stored in them may give rise to the disease as noted above.

A Mirror of Hospital Practice.

A STRANGE PARASITE OF MAN.

By L. M. BISWAS, D.P.H. (Lond.), D.T.M. & H. (Cantab.), L.R.C.P. (Edin.), etc.,

Health Officer, District No. III, Calcutta Corporation.

WITH A NOTE ON THE POLYCHÆTE IN THE HUMAN NASOPHARYNX.

By C. STRICKLAND, M.A., B.C. (Cantab.),

Professor of Medical Entomology, School of Tropical Medicine & Hygiene, Calcutta.

J. M. D., a Bengali Hindu male, blacksmith by caste, aged 42 years, and a resident of Calcutta, consulted me in the first week of November last (1926) for severe symptoms of coryza, the nasal discharge being very thick and tenacious and the headache very bad.

To alleviate the symptoms I gave him medicine and steam-inhalations for softening the mucus, but he had no nasal douche. On the morning of the 13th November I was hurriedly called in to see him. He had after much coughing and sneezing evacuated a worm-like creature from his nose, and this had been thrown on the floor, where it looked like a small mass of muco-purulent nasal secretion with a streak of blood along it. In due course however it uncoiled itself to a length of about one inch and began to move very slowly. At first sight I thought it to be a myriapod, as it had innumerable legs on both sides. When it was crawling straight the legs touched the floor, but when it moved in a serpentine way the legs were held up. As soon as it was put into a tumbler of water it began to swim about vigorously and gracefully, shewing clearly that its nature was aquatic. At its dorsum along the middle line what was taken to be a dorsal artery was noticeable.

Now, how could the creature have entered the nostril of the patient? On enquiry I obtained the following history. He had had the habit of bathing in the Ganges regularly for several years, but had discontinued it for a few months last year (1926), beginning again in October. He had never been to any part of the sea coast for pilgrimage or other purposes. But the river Hugli opposite Calcutta where he used to bathe is tidal and its water occasionally brackish. The man had often suffered from a discharge of thick and tenacious mucus from his nose which, however, was never very troublesome: it was in November last when he consulted me that his suffering became acute. He was accustomed to eat river-fish but well-cooked, and he had never eaten sea-fish or any vegetable growth of the river or sea.

The worm after discharge lived for about 24 hours in water containing nasal discharges. After its death the body extended to double its original length showing the extensible ringed appearance of the body. What had looked like legs were on close examination found to be in reality paddle-like false feet which carried bunches of bristles at their ends and also there were bristles on the annulations of the body. On consulting my books I found that according to the classification of Mr. H. A. Baylis, M.A., D.SC., F.Z.S., it belonged to the class Chætopoda and order Polychæta. I showed the animal to Dr. C. Strickland, Professor of Medical Entomology, School of Tropical Medicine and Hygiene, Calcutta, who also identified it to be a Polychæta.

So far as I am aware, the polychætes live in sea-water and their occurrence in the human body has never before been recorded. In this case the infection took place possibly from a cocoon which had been carried up the river by the tidal bore and had escaped the fish and other aquatic animals that might have devoured it. It cannot be ascertained exactly how long the cocoon had remained in the nostril of the patient and how long it took to develop into a worm. The total period of suffering of the patient was 6 days and as soon as the worm had passed out of the nostril, the symptoms disappeared. On microscopic examination the mucus adherent to the worm showed no ovum or any abnormality.

The creature has been preserved in the Entomological Department of the Calcutta School of Tropical Medicine.

NOTE ON THE POLYCHÆTE LIVING IN THE HUMAN NASOPHARYNX.

By DR. C. A. STRICKLAND.

THE position that the Polychætes hold in the scheme of nature may be briefly referred to. They belong to the primary natural group or *phylum* the *Articulata* (Lankester) which comprise the creatures with at least some pretension to the possession of jointed appendages (called parapodia): these being used for the procuring of food or for locomotion. The members of this phylum are classified as the three subphyla, the rotifers (microscopic pond-animalcules), the annelids ('segmented-worms'), and the arthropods (insects, etc.,) and it is to the annelid subphylum that the polychætes belong, just as do the earthworms and leeches. It is natural then that Dr. Biswas in view of this community of structure

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of annelids with Arthropods, thought at first he was dealing with a 'myriapod.' *

The annelids, as far as man is concerned, except for the leeches which, as is well known, are parasitic in habit, have been usually regarded as being no worse and no better than the gentle earthworm. It is only when we come to the subphylum of arthropods (the insects, mites, scorpions, centipedes, etc.,) that the fun for man really begins.

The case therefore mentioned in the above paper of a polychæte infesting man is very interesting, as it appears to be the only one on record of a non-blood sucking annelid, on one of its lawful occasions, having had anything to do directly with man's health and happiness.

It must be pointed out; however, that although polychætes have never apparently caused offence to man or even other vertebrates such as fish, they are prone to parasitism and commensalism, numerous observations of these phenomena having been made relative to the lower animals such as starfish, molluscs, crabs or even other polychætes. *Vide* St. Joseph (1888).

Further, Benham in the *Cambridge Natural History* points out that the Polychætes are as a rule very adaptable to changes in their environment, such as the salinity of the water in which they may find themselves. Their habitat of election is, however usually the sea, and most of the species are not found where streams of fresh water enter it.

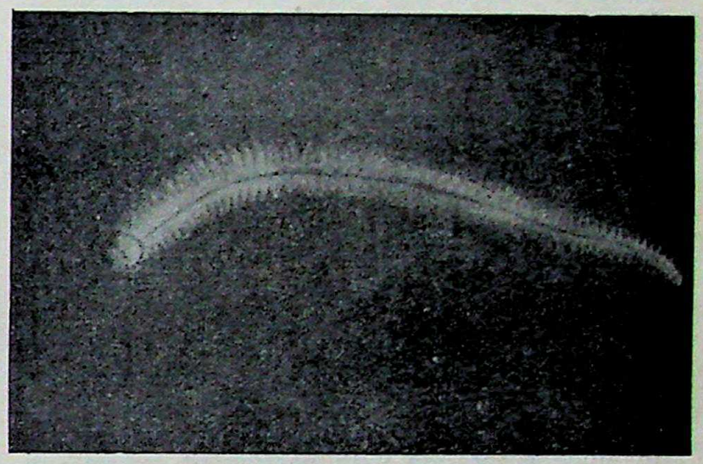
A few, however, have been found in drinkable water, perhaps a chance habitus, shewing their adaptability. The specimen now being considered must indeed have been adaptable to have found its way, as it is assumed it did, from the sea into the Ganges, surviving that journey, and then into a man's nasopharynx, surviving there for a week without having the benefit even of the soothing fountains, so Dr. Biswas informs me, of nasal douches of salines.

There may of course have been some method in its madness for the Polychætes as a class have a habit of burrowing or living in tubes of mud, and it may perhaps be surmised that when it saw the patient's nostrils it may have thought that here was a haven of rest such as it had been used to. Sad disillusionment.

It is very difficult to understand, however, how a creature nearly two inches long could have entered into a man's nasopharynx at all without his putting up a tremendous struggle for the mastery. It may of course have entered as an egg, or larva, but against this hypothesis is the fact that polychætes are carnivorous or vegetarian creatures and it is unlikely that this specimen entering in the so-called trochosphere stage could have derived enough nourishment from its host's nasopharynx to enable it to grow up. Dr. Biswas says that his patient was not accustomed to eating river footstuff, so this possible route of entry is excluded.

Major Sewell, I.M.S., the Director of the Indian Museum, Calcutta, kindly informs me that the specimen is one of the genus *Nereis*, subgenus *Neanthes*. A photograph of the creature is here given.

It had reached the heteronereid stage, that is, it had undergone a certain amount of metamorphosis coincident with attaining sexual maturity. It is, it may be noted, interesting that



metamorphosis however slight should thus manifest itself in such a lowly relation of the insects, while not appearing in the intervening forms such as Peripatus or Diplopods. These Heteronereids are mostly free swimmers, while the trochospheres, or larvæ, are crawlers on the seabed, another point in favour of the hypothesis that it was not as an immature form that the creature entered the man's nasopharynx, but as a full grown Heteronereid, (difficult as it is to believe it).

The female Heteronereids sometimes cover themselves with a gelatinous secretion into which are passed the eggs in an orderly manner: she swims about and the eggs become fertilised by the free living sperms. The appearance that the creature had on being discharged from the nose, viz., that of a mass of mucopurulent material may have been due to that state.

I may conclude by saying that the moral to be drawn from the case is that polychætes should be looked for in all cases of acute coryza; and nasal saline douches withheld until "polychætosis" is excluded so that the symptoms should thereby be not perhaps aggravated.

We owe our thanks to Dr. D. N. Roy, Assistant Professor of Medical Entomology for assistance in conection with the above paper.

*— a name which in itself implies some community of structure, for it is given to an unnatural combination of Diplopods (millipedes) and Chilopods (centipedes).

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A DOUBLE INTUSSUSCEPTION.

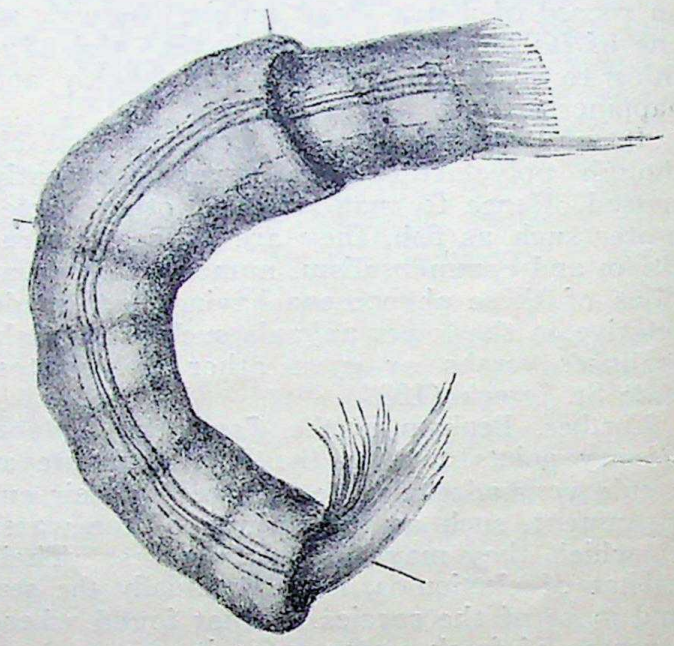
By R. RAMAKRISHNA PILLAI, L.M. & S. (Madras),
Chief Medical Officer, District Hospital, Padmanabhapuram.

EARLY one morning, I was called to see a boy who was described as ailing from dysentery with severe abdominal pain. The following history was elicited.

Brahmin boy, aged 11, previous history healthy, except for attacks of stomach-ache coming on at varying intervals during the previous two or three years. They were not sufficiently severe to deserve the serious attention of the parents. The last complaint began one evening as stomach-ache of the usual kind. It proved to be severer, more prolonged, and gave him a restless night. Worm trouble was suspected, and he was treated with santonin and castor oil. Two round worms were passed and he had about five loose motions. No mucus or blood present. The pain became worse with the purge, was colicky, severe, and intermittent and had continued so since. Paroxysms came on at varying intervals, remissions occurring sometimes for hours together. Three days after the purge, he noticed blood and slime in the stools, was treated for dysentery for many days, and had several doses of Mist. Olei Ricini and Mist. Aperiens. The pain and frequency of the motions increased and his general condition grew bad. Two days previous to my seeing him the pain became very severe. Paroxysms came on in quick succession with passing of mucus and blood every 10 minutes or so. To these was added frequent vomiting of bile-stained fluid or of what was taken in. It had no bad odour.

On examination, the boy was emaciated and pale, temperature normal, pulse 100, respiration 24, tongue clean and moist. He had frequent vomiting of bile-stained fluid, passed blood-stained mucus unmixed with fæcal matter with much straining and tenesmus, thrice during the examination. The abdomen was not markedly distended, but was somewhat rigid and tympanitic. Palpation showed in the left epigastrium a well defined, tender, almost immobile tumour placed a little obliquely from above downwards and outwards near the middle line. It was not sausage-shaped, nor had it any definite curve towards the navel. With paroxysms of pain the mass became more obvious and rigid. Percussion elicited impaired resonance over it and normal resonance around. No visible peristalsis. Lack of resonance in the right iliac fossa (sign of Dance) not noticed. No other tumour in the abdomen was evident to palpation. Digital examination detected a soft mass protruding into the rectum above, and on withdrawing the finger some blood-stained mucus escaped, a sign considered characteristic of intussusception.

A diagnosis of intussusception was made and immediate operation urged. The patient was admitted into hospital and operated on soon after. The abdomen was opened by a left paramedian incision. The first abnormality noticed was a large, tense, bluish, almost vertically placed tumour mass. This proved to be an intussusception of the colon. The lower portion of the descending colon was invaginated into the upper, the apex of the intussusception being towards the cæcum. The uninvolved portion of the former was felt to contain something loose inside it, which extended down to a little beyond the sigmoid flexure. In the right iliac fossa the cæcum was absent and was found invaginated into the ascending colon. A diagrammatic sketch of the finding is herewith sent. The colic intussusceptions was reduced by pressing out from above and by gentle traction on the returning tube. It proved a tedious process as the mass was very tense and adhesions were present. On reduction a few rents were found in the peritoneal coat. They were sutured and sealed with omental grafts. The whole intussusception revived and changed colour soon after reduction was complete. The intussusceptum inside the colon was very loose and was easily reduced. The ileum formed the major portion of it. At the final stage of reduction the cæcum fell out of the outer tube by its own weight as it were. It was chronically inflamed, heavy, sodden and abnormally mobile. The appendix was $4\frac{3}{4}$ inches long, thickened and retro-cæcal. At its root it had the size of an ordinary fountain-pen cap. All around the root was an invagination into the cæcum which straightened only when the organ was pulled on. Appendicectomy was performed and the cæcum fixed to the lateral abdominal wall. The abdomen was closed in layers. The patient made an uneventful recovery except for parotitis developing on the left side on the eighth day after operation. It went on to suppuration and had to be opened subsequently. The patient has been doing well since the operation and is now, about eleven months after it, in good health. The attacks of stomach-ache which he used to get now and then, have not recurred.



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Remarks.—The case is an interesting one, as cases of double intussusception are very rare. During the post-mortem examination of children who have died of various complaints, intussusceptions have been found which were often multiple and occurring in directions opposite to that of normal peristalsis. These are believed to occur just before death owing to irregular intestinal movements. But I have not read of a case of multiple intussusception in the living or of one developing on the top of another, as in my case. Here we meet with the strange phenomenon of the intussuscipiens of an already existing, probably, ileo-cæco-colic intussusception, getting infolded contrawise to normal peristalsis. While the apex of one pointed and progressed towards the cæcal area, that of the other did so towards the anus. I shall feel grateful for information regarding cases of the kind on record. In most cases the origin of an intussusception is obscure. No congenital or acquired peculiarity predisposing to it has been described. Constipation, diarrhœa, injudicious feeding, worms, violent purgatives and so on, all agents causative of strong and irregular peristalsis, have been stated as probable causes. A portion of the bowel in such cases is supposed to undergo spasmodic contraction, while the portion below is dilated, with the result that the latter "swallows" the former. Rose and Carless state that in a few cases blows on the abdomen or severe strain during jumping, have been held responsible for beginning the trouble.

In the case under notice it is doubtful if any of these causes operated. The condition of the appendix, its position, the history of several previous attacks of abdominal pain which disappeared entirely after the appendicectomy all point to that organ as the source of the mischief. Its macroscopical appearance was confirmatory of the existence of chronic inflammation for some time. The State Pathologist reported on the appendix as follows "The section shows a groundwork of thickened fibrous tissue with strands of plain muscle coursing here and there. Chronic inflammatory thickening is suggested." It is quite reasonable therefore to suppose that the boy was the subject of chronic appendicitis and that the intussusception commenced as a result of irregular peristalsis set up in that organ. The partial inversion around its root is suggestive of the latter. There have been cases where such peristalsis has proceeded even to complete inversion of the organ. The intussusception, commencing about the root of the appendix, probably became cæco-colic on account of the abnormal mobility of the cæcum and subsequently developed into an ileo-cæco-colic one, the ileum forming the major portion of the intussusceptum. The condition remained as a chronic one in the boy for nearly 2½ months. Chronic intussusception is supposed to be rare in children and in 60 per cent of cases is ileo-cæcal at the ileo-cæcal junction. Its symptoms are described as follows: "Constipation may alternate with diarrhœa, and blood stained mucus is not uncommon in the stools, vomiting is slight, and the pain colicky and intermittent. Abdominal distension does not occur, but waves of visible peristalsis, and hypertrophy of the gut walls may be present. A tumour with the usual characteristics of an intussusception is present in about half the cases. The general health soon begins to suffer, the appetite is poor, the patient loses flesh and strength and finally dies of exhaustion or complete obstruction. The illness in untreated cases, lasts from one month to a year, but mostly about two months" (Russel Howard, '*The Practice of Surgery*). In this boy's case most of the above symptoms were present more or less, and the correct diagnosis was missed for a long time, probably on account of the absence of a tumour. The repeated doses of aperient mixtures which he received for his "dysentery" evidently aggravated the trouble and precipitated a condition of peristalsis "run amok" in the intestines. This produced a backward peristalsis in the descending colon, causing an intussusception in the intussuscipiens of the first intussusception. The very severe pain and suffering of the two days preceding the operation, with the attendant additional symptoms, were the results of the development of this acute intussusception, as was also the presence of the tumour which made the diagnosis easier. Comment on the case is invited.

A CASE OF EXCISION OF THE ELBOW JOINT.

By S. C. DAS GUPTA, L.M.S.,
Senior Surgeon, Bir Hospital, Katmandu, Nepal.

A LARGE number of excisions of joints have been performed at the Bir Hospital here, and their results are very encouraging. In each case the limb in question was shortened to a slight extent, but none of my patients was sorry for the shortening in lieu of an useful limb. I deal here with excision of the elbow joint only and shall reserve other cases for subsequent papers.

I give here details of one particular case, of which I kept full notes. This patient was a coolie in the military transport department; about two years ago he had a fall and fractured the arm near the elbow joint. He was treated by a local barber, who kept the limb in a straight position by means of bamboo splints for a month or so. Of course, union of the fragments took place, resulting in firm ankylosis of the joint. So ultimately he was admitted into the Bir Hospital for operative treatment.

Operation.—The patient was laid on his back, and put under chloroform. One of my assistants was left in charge of the arm which was covered with sterilized towels both above and below the joint, leaving the area of operation bare. The assistant held the arm in extreme *supination* at an acute angle with the body, while

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I stretched the skin at the site of operation with my left hand by supporting at the same time the elbow at its anterior aspect. An incision was made on the posterior surface of the joint—along the longitudinal axis—over the olecranon process "from a point 2 inches above to a point 2 inches below the tip of the olecranon" (Binnie). The incision was deepened to the bone, and the periosteum with the soft parts was separated and well retracted, and the joint was laid quite bare. It was a complete bony ankylosis and everything was jammed together in one mass. The ulnar nerve which was found firmly adherent in the interspace between olecranon and medial epicondyle, was elevated with the periosteum and muscles attached to it, and *levered out* with a periosteum elevator from against the bone—beyond the condyles on either side. Next, I tried to flex the joint, but failed to do so on account of osseous union. So I divided the olecranon process near its base with a Hey's saw, and severed it from the joint by means of bone-forceps. Then I flexed the joint forcibly, and the lower end of the humerus was set free, and "made to project into the wound" (Treves), by depressing the upper ends of both radius and ulna at the same time. The upper arm was held vertically and the lower end of the humerus sawn off just below the level of the epicondyles—by cutting from behind forwards. Then again the end of the humerus was depressed, and those of

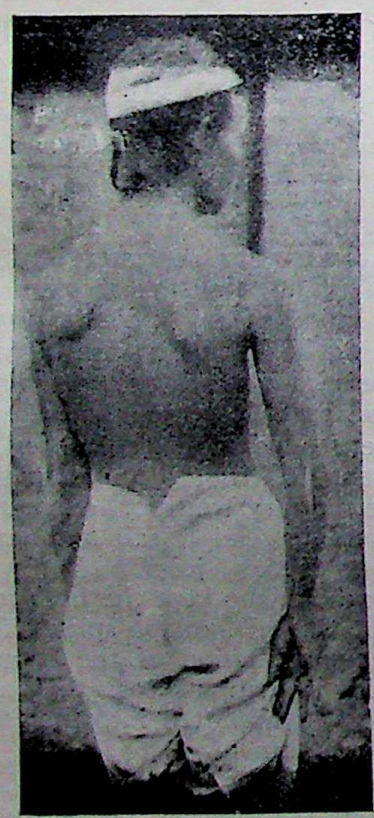

Fig. 1.

the radius and ulna pushed upwards—the joint having been completely flexed—a circular slice of the bone was removed from the head of the radius at the same level with the ulna. Then the wound was washed out with hot normal saline, bony

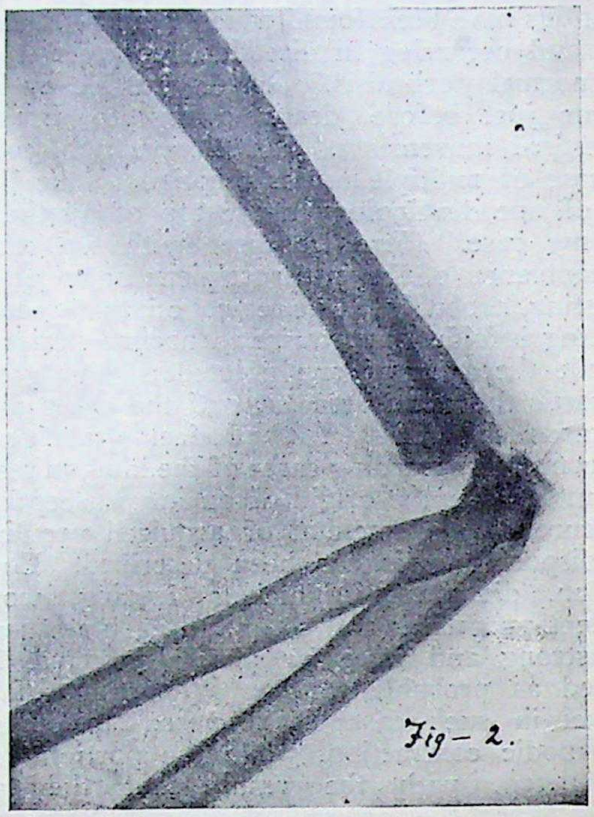

Fig. 2.

particles scraped off, the edges of the ends of the bones *bevelled* and the capsule of the joint closed by No. 3 'Ultratan' 20-day catgut. Finally the muscles were replaced in their respective situations and stitched together with strong catgut, and then the skin was sutured with silkworm-gut. No drainage tube was left in. The wound was then dressed, bandaged and put up in angular splints, the forearm being in the "mid-position between pronation and supination." The stitches were removed on the 8th day. Passive movement and massage were begun from the following day, and the patient left hospital six weeks after operation having nearly complete extension and flexion of the arm. He is in service now.

Notes.—Usually the cases for excision are:—ankylosis resulting from fracture, separation of the epiphysis, dislocations, wounds, sinuses or abscesses near the joint on account of bad or neglectful after-treatment, and tuberculosis of joints. For tuberculosis, "no children should be subjected to excision of a joint except in the rarest circumstances" (Verrall, in Carson's *Operative Surgery*). With adults operation is sometimes indicated. Never should an operation be undertaken until the part is thoroughly aseptic; even if there be a septic focus internally, do not attempt it; because if the wound suppurates, either you will have a worse joint than you had before or you will have to have recourse to amputation. Always leave a drainage tube in tuberculous cases for at least 24 hours, or more if necessary.

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The interspace between the ends of the bones should be at least an inch and a half, i.e., sufficient space for free movement of the bones, but at the same time never more than enough, lest it lead to a "flail-like" joint. The saw-line must be at right-angles to the long axis of the bone, and the soft parts should be carefully protected. Passive movement—slow and gradual flexion and extension—should be done *daily;* the limb should be kept in the flexed condition at night and in the extended position during the day. For this purpose, a splint which permits the joint to be extended or flexed at any angle without its being removed is very suitable. Mason's splint serves the purpose well. The after-treatment is not only tedious to the surgeon, but very painful to the patient also. On an average three months are necessary in order to obtain full flexion and extension without the feeling of pain.

Two photographs are given: Fig. 1 is the photo of the patient after operation with his arm in the extended position, and the other is the radiograph of the arm in flexion. For both I am indebted to Dr. K. Jung Thapa, Radiologist, Bir Hospital.

A CASE OF LARGE PAROVARIAN CYST IN A YOUNG WOMAN.

By CAPT. M. K. PILLAI, B.A., M.B., C.M.,
Civil Surgeon, Pegu.

A TAMIL woman, aged 25 years, was admitted into Pegu Hospital for a large tumour of the abdomen of nearly five years' duration.

History.—She gave the following history. She was married six years ago and at the time did not notice anything abnormal in her abdomen. About six months after marriage, she became pregnant and was delivered of a full term child in due course, but she noticed that a small swelling was left behind in the lower part of the abdomen, which became bigger and bigger till it came up to a level about two inches above the umbilicus, when it was tapped as a case of ascites by a private practitioner and the tumour, she stated, nearly disappeared. A month later, however, the abdomen began to fill up again and as her menses also had stopped about this time, she thought she was again pregnant. She was again tapped and the distension disappeared, but a certain amount of fulness still remained in the lower part of the abdomen. The fulness increased, movements began to be felt and a full term child was again delivered. But she noticed that a tumour about the size of a small football was left behind in the lower part of the abdomen. This became bigger and filled the abdomen again and when the second child was a year old, she was tapped again and the distension was very much reduced and was confined to the lower abdomen only. In a year's time, the abdomen was full again and she sought treatment at this hospital.

Condition on admission.—She was a thin woman, slightly anæmic, temperature and pulse normal. No albumin in the urine. There was partial prolapse of the uterus and vaginal walls, due evidently to pressure of the tumour from above. The case was diagnosed as an abdominal cyst, probably with ascites.

Operation.—Under chloroform anæsthesia, a median incision was made below the umbilicus. The recti were found separated, due to the intra-abdominal tension; no adhesions were noticed to the peritoneum, on opening which the tumour was found to be free and filling the whole abdominal cavity. It was tapped and a clear fluid, similar to that in ascites cases, was drained off to about 3 lbs. The tumour was then delivered out of the abdominal cavity and was discovered to be a large unilocular cyst, apparently arising from the left Fallopian tube by a thin broad pedicle. Only the fimbriated extremity of this tube was not involved in the tumour. The ovary was hanging from below the tumour like a parachute. It was enlarged, hard and fibrotic. The right ovary and the uterus were normal. The pedicle was transfixed by catgut ligatures and the whole tumour together with the ovary was removed. There was absolutely no bleeding. After the usual peritoneal toilet the abdomen was closed in the usual way, the recti being brought together by catgut sutures. A pint of saline was administered per rectum and the patient put to bed. She made an uninterrupted recovery. The sutures were removed on the 8th day and the patient discharged from hospital with an abdominal support a fortnight later.

The tumour was examined by the Professor of Anatomy, Medical College, Rangoon, and was pronounced to be a parovarian cyst.

The woman was seen by me about four months after discharge and she looked perfectly healthy, with menses coming quite regularly every month.

A CASE OF LIVER ABSCESS.

By AMULYA KUMAR BHATTACHARYA, L.M.P.,
Medical Officer, Dalgram Dispensary, Rangpur.

SAMIR, Mahomedan male, aged about 50 years, was admitted to this dispensary on the 13th August, 1926, with pain and swelling in the hepatic region, of about one year's duration.

His history was typical of hepatic abscess. The condition had commenced in September 1925, and he first consulted a *kaviraj.* In November 1925 he attended this dispensary and had a course of emetine injections with much benefit, but discontinued treatment too soon. There was no history of dysentery or of venereal disease.

On admission the patient was much emaciated, and suffering severe pain. The temperature varied between 100°F. and 102°F. The hepatic area was tender to pressure, and hepatic dulness extended to four fingers breadth below the costal margin. He could walk only in a

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stooping posture. A diagnosis of liver abscess was made.

Treatment.—He was given one grain of emetine intramuscularly for nine days. After nine days the temperature became intermittent, but there was no other change in his condition. Accordingly, on the 22nd August I aspirated the swelling through the 7th intercostal space in the mid-axillary line: 550 c.c. of pus were withdrawn.

A second course of emetine—six injections, each of one grain—was next given. The abscess cavity, however, refilled, and on the 8th September a further 33 c.c. of pus were withdrawn, and the abscess cavity irrigated with quinine solution.

Despite these measures, however, the patient's condition became worse, and I decided to operate without further delay. On the 19th September operation was carried out, by a three-inch incision just below and parallel to the costal margin. A drainage tube was left in the abscess cavity and fixed to the margin of the abdominal wound, the rest of which was sutured. The patient now made an uneventful recovery and was discharged from hospital cured a month later.

Remarks.—The failure of emetine in this case is to be noted. After the first course of emetine, in 1925, the abscess remained in a semi-dormant condition for nine months. The medicinal treatment of amœbic abscess of the liver by emetine, I believe, is only of use when the cavity is a small one.

I must express my thanks to Dr. Abed-ud-Din Ahmed, M.B., for his kind assistance at the operation, and to Compounder Sheikh Fazar for his care of the patient.

A CASE OF MULTIPLE STONES IN THE BLADDER.

By CAPT. M. NAMABUD DIN, M.B., B.S.,
Assistant Surgeon in charge, Civil Hospital, Shahpoor Sadar, Punjab.

NAZA, Mahomedan male, aged about 50 years, was admitted to this hospital on the 28th September, 1926, complaining of severe pain on micturition, and at the time of admission of complete retention of urine. He was very weak and emaciated and had threatening signs of uræmia. He gave a history of gleet, and organic stricture of the urethra was also present.

On examination it was found that the bladder was full of urine. There was a scar in the median raphe of the perineum, due—according to the patient's statement—to a previous operation for stricture. He had double oblique inguinal hernia. On passing the bougie, only a No. 2 could be inserted through the stricture, and with the bougie *in situ* I detected several stones in the bladder. They suggested crushed pieces of calculus after litholapaxy, and it is not uncommon for patients in this part of India to walk about after litholapaxy with such fragments still *in situ*. One way and another, the patient was a veritable museum of genito-urinary diseases.

Although the patient was very weak I decided to evacuate the calculi, and did so with the evacuator under chloroform anæsthesia. Eight small facetted stones were evacuated, 2 drms. in weight, and resembling gall stones, but insoluble in chloroform. I detected the presence of other and larger stones still in the bladder.

The patient was now given three days' rest and on the fourth day suprapubic lithotomy was carried out, and three large stones weighing 2 ozs. extracted. After this the patient commenced to recover, and the bladder was washed out every third day. Owing to the stricture, however, he used to get catheter fever, and began to get œdema of the right half of the scrotum, owing to extravasation of urine. This œdema then went on to the formation of a scrotal abscess, which had to be twice incised for drainage. The incisions became transformed into sinuses through which foul-smelling pus was discharged. Healing of the suprapubic wound was also slow, and owing to the stricture no proper flow of urine through the urethra could be obtained.

In order to relieve the condition I began to pass small bougies every alternate day and dressed the suprapubic wound daily with electrolytic chlorine solution. Under this line of treatment the patient made a speedy recovery, all the wounds healed within ten days, and a proper flow of urine was established through the meatus. He was discharged cured on the 8th December, 1926. I have seen him three or four times since that date, and he is in good health, with no urinary trouble. He hopes to have operation for the radical cure of the hernias carried out later.

I have operated on many cases of vesical calculus before, but have never previously encountered as many as eleven stones in the bladder.

A CASE OF EXTRAVASATION OF URINE.

By CAPT. A. R. BHAT, F.C.P.S., B.M.S.,
Mirpurkhas, Sind.

EXTRAVASATION of urine is a common disease in Sind, and cases are seen in children, adults and older people, a frequent cause being vesical calculus, which is very prevalent in Sind. As a student, what had impressed me most with regard to these cases was the extreme agony which most of the patients suffered, and the almost invariably fatal result. Better results have been secured of recent years in this hospital, and the reason for the improvement probably is that these cases are here treated by perineal cystotomy. Of several interesting cases, the one quoted below may be given as an example.

Samo, male, aged 10 years, was admitted to this hospital with extravasation of urine of seven days' duration. The boy had had symptoms of vesical calculus for several years, and was in extremely bad health even before the

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extravasation occurred. On admission, the scrotum was found to have entirely sloughed, and the patient was in an almost moribund condition. There was no retention of urine.

External urethrotomy was decided upon, but the grooved staff appeared to pass in every direction into soft and gangrenous tissue, though not into the bladder. The patient was, therefore, anæsthetised, and with a guiding finger in the rectum, the perineum was incised with a long-bladed knife. Several calculi were removed from inside the bladder, and a thick rubber drainage tube inserted. A few incisions into the sloughing scrotum completed the operation.

In spite of the extensive sloughing present, once perineal drainage was established the sloughs separated, the wound granulated and healed up quickly, and the patient made a straightforward recovery.

A CASE OF HYDRAMNIOS.

By N. M. DAVE, L.C.P.S.,

Mogalkot, Nadiad.

A FEMALE patient, of the agricultural class, about 32 years of age, was brought to my dispensary in a carriage, suffering from enormous enlargement of the abdomen. She gave a history that she had been married at 12 years of age and had had six children, of whom all but the first were alive. The last child was born six years previously. All the confinements had been straightforward and without complications. The menses had been regular as a rule; there was no history of abortion or of venereal disease, and no objective symptom to suggest the latter. The abdomen had, however, been gradually enlarging for the past 17 months, and during this period there were only scanty menstrual discharges every 25 to 28 days. She had felt no quickening.

On examination, the tumour was found to occupy the whole abdominal cavity, extending from the costal margin to the symphysis pubis, Poupart's ligament, and both flanks. It was uniform and globular, dull on percussion, and not affected by changes of position. No fœtal heart sounds could be heard. There were no mammary changes. There was constipation, cardio-pulmonary dyspnœa, dysuria with frequency, and slight œdema of the lower extremities. The patient asked for "medicine in a bottle," but operation was advised.

The next morning, however, labour pains suddenly started, and the patient passed into an unconscious state. An enormous quantity of amniotic fluid was discharged, followed by a dead and deformed female fœtus, which was flat as if it had been pressed between two hard plates. Fearing post-partum hæmorrhage, I gave an injection of ergot and strychnine, and later of pituitrin; also calcium chloride intravenously. She escaped all complications, however, and made an uneventful recovery.

No sound was passed during the first examination of the patient, but vaginal examination suggested that the enormous swelling was connected with the uterus.

Interesting points in the case are (1) its long duration, (2) the absence of amenorrhœa, and, (3) the spontaneous onset of labour at such a late period.

A CASE OF SYMMETRICAL ENCHONDROMATA (?) OF THE EYELIDS.

By GOPAL R. TAMBE, M.A., B.SC., L.M. & S.,

Chief Medical Officer, Cutch State.

THE photograph here published is that of a boy who was brought to me for opinion and diagnosis. The condition appears to be possibly one of symmetrical enchondromata of the eyelids. This disease is one of extreme rarity, and is only passingly referred to in Fuch's *Textbook of Ophthalmology*. In this particular patient points of interest are the young age of the patient and the symmetrical condition. The history given was that the growths had enlarged fairly

rapidly, whilst—as will be seen—the right eye has become nearly closed by the growth.

I advised removal of the growths, but to this the parents of the boy refused to consent.

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(*Note.*—We have submitted the above notes and photograph to Major R. E. Wright, I.M.S., Superintendent, Madras Government Ophthalmic Hospital, who writes:

I do not think the case is one of Mikulicz's disease, as there is no record of any salivary gland enlargement, nor would one expect enlargement of the lower lids to this extent. It would not appear to be a case of bilateral enlargement of the lachrymal glands with leucocythæmia, otherwise the leucocythæmia would have been noted, and such cases are nearly always fatal. Here again the lower lids would not be so prominent. It might be a case of amyloid degeneration, but I think it is unlikely. I herewith send you a record of such a case showing enlargement of both upper and lower lids.* I do not think a diagnosis of symmetrical enchondromata is justifiable without a histopathological investigation, which the refusal of the parents to allow operation unfortunately prevents. The condition must be extremely rare. I personally have never seen it, nor can I find any reference to it in the literature at my disposal, except the mere mention of the name. This is all that is given in Fuchs, for instance.

I think it much more likely that the condition is of a lymphoblastomatous nature. This is the commonest bilateral tumour condition which involves the lids in this way; in fact lymphoblastomatous infiltration of the orbit and lids is comparatively common, quite apart from cases associated with blood changes. There are numerous varieties of this lymphoblastomatous proliferation. For instance, the variety mentioned by Elliot in his *Tropical Ophthalmology* as described by McAll, which occurs in China. It occurs here too, but not to the same extent. I am afraid the only rational thing to do about making a diagnosis would be to excise a small portion of the tissue from beneath the palpebral conjunctiva and have it sent for histopathological examination, and to have films made of the child's blood for examination.—EDITOR, *I.M.G.*).

* Wright, R. E. (1925). A case of amyloid degeneration of the conjunctiva. *Archives of Ophthalmology.* LIV, No. 3, p. 280.

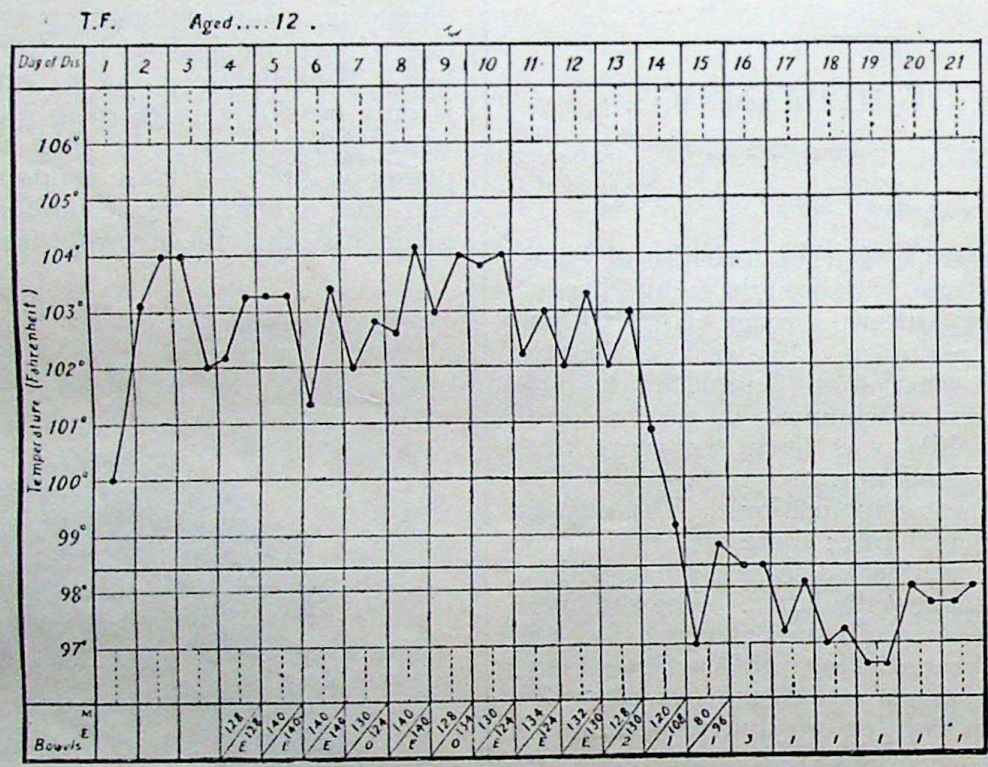
TWO CASES OF TYPHUS FEVER IN KUMAON.

By R. N. BANERJEE, B.SC., M.B., B.S.,

Allahabad.

It has long been known that typhus or tick-typhus is endemic in the Kumaon Hills; most of the cases occur among Indians, but as I have recently had the opportunity of seeing two cases in Europeans who were under observation in hospital I think a short note on them may be of interest.

Case 1.—T. F., a school girl of 12, and a boarder at one of the girls' schools in Naini Tal was attacked with fever on 29th August, 1926. She vomited at the onset, and again several times the next day. By the 31st it was obvious that the illness was severe, she had much pain in the back, she was constipated, and complained of headache. The following day she was admitted to the Ramsay Hospital as there was a slight rash appearing on the body. The mental condition was already rather dull, the face flushed, and the eyes bright and slightly suffused. The tongue was very thickly coated and throughout the rest of her illness presented a wash-leather appearance except for a few days when it was dry. The urine contained much albumin. A day later the rash had become typical, there was a measly mottling all over the body, with papules like those of enteric fever scattered about. Subcutaneous hæmorrhages were not



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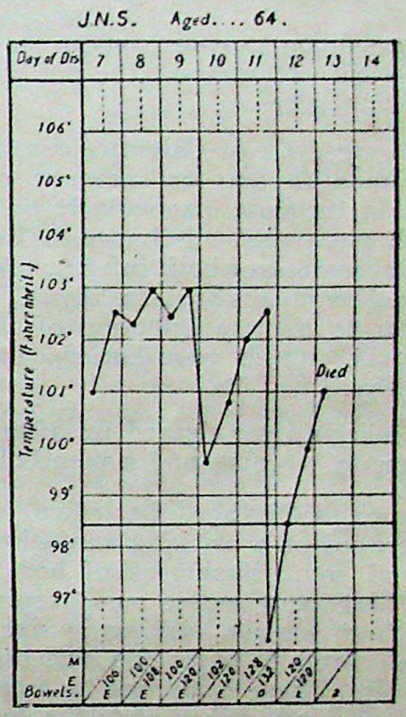
present. On 4th September she had all the appearance of a severe case of typhus. There was delirium, and though she could answer questions she did so with a peculiar slowness, with a long reaction period which has been described elsewhere as very typical of typhus.* In spite of constant cleansing, the teeth and lips were covered with sordes. The same day she bled repeatedly from the nose, and later passed a large amount of blood from the bowel after an enema. The next day there were several discharges of blood from the bowel but no further epistaxis. On account of the hæmorrhage she was given an injection of horse serum and no more bleeding occurred. It is however impossible to claim this as a result of the injection as the blood may have been swallowed, and the bleeding from the nose had already ceased. At the time, as the blood was both bright and copious I thought it must be intestinal, but since then I have seen blood equally bright and equally copious from a case of hæmorrhage after tonsillectomy.

After the hæmorrhages she was rather cyanosed, there was a loud murmur in the pulmonary area, and the tongue was dry. On the 6th the rash had faded and the mental condition began to improve. From now onwards her general appearance was much better than before, in spite of an attack of non-suppurative parotitis. On the 11th the temperature fell by crisis after which the parotitis rapidly cleared up.

The nurses commented that she "smelt like a box full of dirty socks," which strikes me as an excellent description of the characteristic odour of typhus.

Culture of the stool for the enteric group was negative and the blood culture in bile broth was negative also. The Widal reaction on the 11th day was negative. I am indebted to Major Bridges, R.A.M.C., for these examinations.

Case 2.—J. N. S., male, aged 64, was admitted on 9th September on about the 7th day of his illness, from Naukatchiatal, a journey of about 15 miles. He gave a history of low continuous fever and of sleeplessness. He was rather confused and flushed and his speech and the appearance and mental condition were suggestive of intoxication, though he had not taken alcohol. The tongue was very heavily coated, the eyes suffused, and the throat congested. (He suffered from chronic nasal catarrh.) The urine gave a faint cloud of albumin on examination. The heart, lungs, and abdomen were found normal and the pulse was firm—perhaps a little too firm. Vomiting was severe and it was difficult to supply sufficient fluid. There was a faint rash on the chest and axillæ on admission and this was marked and widespread by the following day. On the 16th the Widal reaction was negative and on the 17th the Weil-Felix reaction was negative. For the latter Major Bridges used a strain obtained from Kasauli.



On the 19th the patient was in a grave condition. He was nearly comatose and was picking at the bedclothes. The pulse was softening and the excretion of urine appeared to be scanty. There were muscular twitchings, as in uræmia, which condition his whole appearance suggested.

He was given an injection of 10 c.c. of the serum obtained from Case 1, but as the serum was not quite free from blood corpuscles it was given intramuscularly. Two hours later he had a short rigor followed by a fall of temperature to below normal. The temperature rose to 100°F. on the following day but the general condition remained the same and he died on the 21st September, the 13th day of the illness.

I could find no clue to the source of infection in the first case, in the second, a daughter of an Indian employee of the patient had typhus just before his illness. Neither case infected the attendants and neither gave a history of tick bite, nor did they harbour lice, for which a careful search was made.

* Husband and McWatters—Typhus fever in Northern India—*Indian Medical Gazette*, 1908.

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SUNDRY CASES. (1) KERATOSIS PHARYNGIS AND LARYNGIS. (2) LONG SOJOURN OF A FOREIGN BODY IN ŒSOPHAGUS. (3) A CASE OF LIVER ABSCESS BURSTING INTO THE RIGHT LUNG.

By F. H. B. NORRIE, M.B., Ch.M., F.R.C.S. (E.),

Medical Officer, The Angus Co., Ltd., Hooghly, Bengal.

Case 1.—Keratosis Pharyngis and Laryngis.

THIS condition would appear to be of sufficient rarity to warrant the publication of the following notes.

Miss S., aged 28, of Calcutta, consulted me about 8 months ago on account of some stuffiness in the nose, particularly on the left side, with post-nasal discharge. There was slight enlargement of both inferior turbinates, and some clear mucus post-nasally. There did not appear to be any infection of the nasal sinuses. The tonsils were buried, but otherwise healthy.

The condition then cleared up after several applications of cocaine and a menthol spray.

About two months ago, she again consulted me on account of a pricking sensation in her throat, and some huskiness of her voice at night. There were numerous greyish-white spots on both tonsils, varying in size from a small pin's head to twice the size of a vesta match-head. These could not be mopped off, as they were firmly adherent to the underlying tissues. A diagnosis of keratosis pharyngis was made, and specimens were taken with a view to confirming this. The sections of the removed tissues showed collections of heaped-up epithelial cells.

The patient was given Mandl's paint to apply locally, and advised with regard to the nature of the condition. Since then the number of the spots has increased, and there are now several on the lingual tonsil and ary-epiglottic folds. Apart from the pricking sensation in her throat, which has not diminished, there are no other symptoms.

Keratosis pharyngis is not a common condition, but is less uncommon than keratosis laryngis. Logan Turner states that the condition is not a serious one and that it should not be interfered with, as it tends to disappear spontaneously, and treatment does not help. Our experience would tend to confirm this as now the right tonsil, from which the specimens were obtained, has 4 or 5 times the number of spots appearing on the left. This condition might be mistaken on a cursory examination for chronic lacunar tonsillitis, but a probe or swab will quickly decide this.

Case 2.—Long Sojourn of a Foreign Body in the Oesophagus.

The patient, a Hindu female child, aged 3½ years, was brought to the dispensary on September 3rd, 1926 with the history that she had swallowed a pice* two months previously. Since then she had had difficulty in swallowing solid food and had become very thin. The child looked poor and ill-nourished, but had no fever, dysphagia, or dyspnœa.

The patient was screened antero-posteriorly and a circular foreign body was seen just above the supra-sternal notch. Laterally, it was seen that the foreign body was flat and that its upper end was tilted forwards. The size corresponded with a pice, and the position to the œsophagus at the entrance to the thoracic cavity.

Under chloroform, laryngoscopy was performed with a Jackson's speculum. There was no apparent œdema of the tissues, but some excess of secretion, which was removed by suction. The coin, with the upper edge tilted forwards, was seen lying below the crico-pharyngeus. The lumen of the œsophagus was reduced to a small semilunar slit anteriorly.

The position was rectified, and the coin, which was firmly embedded, removed with a Jackson's lateral grasping forceps. An attempt was made with a toothed forceps, but unfortunately this slipped. The coin was discoloured and partly eroded. The site which it occupied was ulcerated, but not to a marked extent. The child was given a mixture containing bismuth to take before meals.

This case is perhaps of interest owing to the length of time the pice had been *in situ*, and from the fact that, although only a small lumen remained with the coin sloped from before backwards and above downwards, thus forming a pocket with the posterior œsophageal wall, yet the child had survived so long with dysphagia and emaciation as the only symptoms. According to Jackson such foreign bodies may remain *in situ* for a considerable time without causing any marked symptoms, but eventually they cause death unless removed. Removal or attempted removal with a coin-catcher is a most dangerous procedure.

Jackson states that more harm is done by ill-advised and ill-directed attempts at removal than by the foreign body itself.

The following up of cases in India is almost impossible, and since this child was brought

* For the benefit of readers overseas, we may remark that a "pice" is a copper coin of about 24 millimetres in diameter.—ED., *I.M.G.*

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from a village some sixteen miles away it is improbable that we will be able to see her again, with a view to relieving her of a stenosis which is likely to occur.

Case 3.—Patient No. 119. Angus Hospital.

Laksham Mia, aged 50, Mahommedan male, an inhabitant of Alakbani, Pipra Police Station, Matihari District, was admitted to hospital on the 21st June 1926 with the following symptoms:

(*a*) Pain and considerable bulging in the right hypochondriac region.

(*b*) Severe convulsive cough, and reddish brown expectoration.

(*c*) Fever.

(*d*) General emaciation.

He is a weaver in the Hessian Department of the Angus Jute Mill. He smokes tobacco, but does not drink alcohol. He has lived in *pucca* coolie lines for the last 6 years, and takes an ordinary mixed Mahommedan diet.

In his youth he drank *tari* (toddy) for 2 years. About 4 years ago he suffered from dysentery, which lasted for a month, and for which he was treated by a *hakim* in his village. About 3 months ago he suffered from remittent fever for 20 days. After that he experienced severe pain in the right hypochondriac region. The pain was continuous for 3 weeks and he was treated with quinine with no benefit. Later, he developed a cough with reddish expectoration, and the pain was lessened to some extent. He had expectorated pus mixed with blood for about a week before admission.

Present condition on admission.—The patient complains of a dull, aching pain in the right hypochondrium, extending to the right shoulder, with tenderness on pressure over the hepatic area. The right lobe of the liver is enlarged upwards, whilst its lower margin can be felt 3 inches below the costal margin. The temperature is normal in the morning, but rises in the afternoon, sometimes with a rigor, to 100—101°F. He has profuse perspiration. The face is pale, complexion muddy, and the conjunctivæ bile-stained. The 4th, 5th, 6th and 7th right intercostal spaces bulge outwards in the axillary line. Cough with brick red expectoration continues.

Respiration is increased to 30 per minute. The lower two-thirds of the chest bulges outwards, and movement is diminished. Vocal fremitus is diminished on the right side. On percussion the liver dulness commences on the right side

from the 3rd intercostal space in the nipple line.
" " 5th " " mid-axillary line.
" " 7th " " scapular line.

The breath sounds are diminished on the right side. Rales and rhonchi are heard over the lower half of the right lung.

No tubercule bacilli were found in the sputum, which contained numerous pus and blood cells. The cardiac apex beat was in the normal position; the pulse 70 per minute, the rhythm irregular, volume small, and tension low. The total leucocyte count was 22,000 per c.mm. With regard to the alimentary system the appetite was diminished, the bowels irregular. The breath was offensive, and gingivitis was present, whilst the tongue was thickly coated.

The abdomen was sunken, but there was bulging present in the right hypochondriac region, with diminished movement of the diaphragm. There was dulness over the bulging area, as well as in the upper part of the right lumbar region.

Examination of the stools showed cysts of *Entamœba histolytica* and vegetative and encysted forms of *Giardia intestinalis*. The urine had a specific gravity of 1022, was alkaline, and showed albumin. Excess of phosphates was present in the deposit, together with numerous blood cells and some pus cells.

Diagnosis.—It was obvious from the above picture that we were dealing with a case of amœbic abscess of the liver which had ruptured into the right lung.

Treatment (*a*) *Surgical.*—Under novocaine anæsthesia a needle was inserted in the 8th intercostal space in the axillary line posteriorly on the 21st June, and pus was found. An opening was made along the course of the needle and two drainage tubes inserted in the intercostal space. Irrigation of the wound was carried out with eusol every 3rd or 4th day according to the condition of the discharge, and was continued for 3 weeks.

(*b*) *Medical.*—A course of emetine hydrochloride, 1 grain subcutaneously every alternate day, was commenced from the 2nd day after operation. In the intervals between injections stovarsol was given, 2 tablets at night. He received in all 8 injections of emetine and 16 tablets of stovarsol. He was put on cod liver oil and creasote from the date of admission.

Within a few days of operation the patient's general condition improved and the blood-stained expectoration ceased. For a purulent discharge from the wound which persisted, he was given an autogenous vaccine of streptococci and staphylococci intradermally twice a week from July 20th for 18 days. The patient was discharged cured on the 13th August 1926.

I am indebted to Dr. K. M. Chakravartty for the notes on these cases.

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A CASE OF BLACKWATER FEVER.

By LIEUT. T. W. TWELLS, I.M.D.,

Medical Officer in charge, T. C. Dispensary, Roorkee.

J. E. H., European male, aged 25 years, training for a missionary, was taken ill on the night of the 12th November, 1926. As the medical missionary under whom he was serving had gone into camp a few days previously, I was called to see him on the 16th November, and found him seriously ill with no one to look after him. He complained of intense headache, vomiting, inability to keep anything down, and great thirst. He was extremely restless, could not sleep, and was passing blackish-coloured urine. A blood film was taken and showed *Plasmodium falciparum* infection. That evening, as he was a little better, he was taken in a motor car to another mission a quarter of a mile away and looked after by the lady missionary-in-charge, who had volunteered to nurse him. The chart shows his temperature, details of treatment, etc.

On the 19th, the patient was seen by Major Penny, I.M.S., the Civil Surgeon, who pronounced the case to be one of blackwater fever. As parasites were still present in the films, he advocated giving quinine cautiously, starting with 2 grains a day, and gradually working up to 20 grains a day. Under this line of treatment the hæmoglobinuria cleared up, and the patient's recovery was uninterrupted.

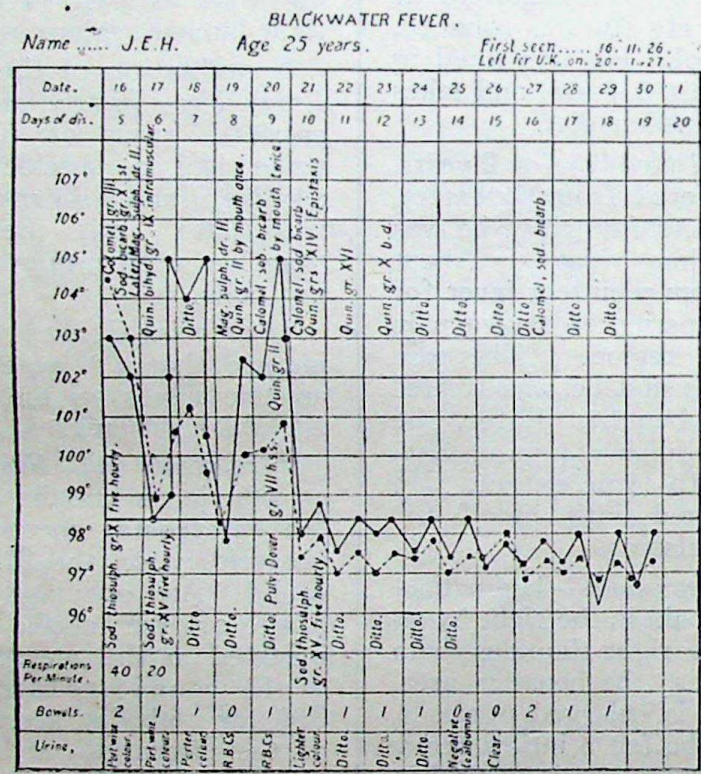
Discussion.—The patient had served in the Army at Mhow and Nowshera. Whilst on leave, he had visited Vizagapatam, Bezwada, Bangalore, Coonoor, Wellington, and Mussoorie. During his army service of about 6 years in India he had never had malaria, nor had he ever had a dose of quinine—whether prophylactic or otherwise. He came to Roorkee from Mussoorie at the end of September, 1926, and went to the Shanhkumbri Fair in the Siwalik Hills on the 16th October 1926 and remained there till the 23rd October. Whilst there he did not use a mosquito net.

The patient had been a little more than 6 years in India and had never had malaria. To use his own words "I never had a dose of quinine in my life." At the suggestion of the Civil Surgeon, notes of the case are sent for publication, to ascertain if possible the views of former Civil Surgeons and medical men resident in or familiar with the district as to whether blackwater fever is occasionally to be met with. The case appears to be unique in that

1. The patient was not an irregular taker of quinine.

2. This was his first infection with malaria in any form.

He was invalided Home and was advised not to return to the tropics, as it would appear that a relapse or a re-infection might readily lead to a recurrence of the blackwater fever. The presence of hæmoglobin in the urine during his attack was verified both by the Civil Surgeon, and by Captain Pershad at the British Military Hospital and the Indian Military Hospital in Roorkee, to both of which officers samples were sent.



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Indian Medical Gazette.

MAY.

SUGGESTION AS A TREATMENT.

THE interesting paper by Dr. Nunan in this month's issue raises the question of suggestion as a factor in the cure of disease.

Dr. Nunan need not be regarded as suggesting that "barber's itch" ought to be treated by suggestion rather than by local applications. In the case referred to the disease may have been kept up by the local treatment, so that the cure may have resulted from the cessation of meddlesome treatment rather than from the alternative treatment which was adopted.

But though we may start out with a determination to avoid undue enthusiasm, there is very convincing evidence that suggestion can play a powerful part in the treatment of many diseases.

There is one group of diseases included under the name "hysteria" for which suggestion is *the* treatment. There are other diseases which are associated with well known physical causes in no way connected with suggestion, yet these may be influenced favourably or unfavourably by suggestion. When a patient knows himself to be ill he is often unduly depressed by thoughts connected with his disease, the feeling of depression causes loss of appetite, enfeebled cardiac action, diminution of the endocrine secretions and a general lowering of vitality. In this way a vicious circle is established, the illness causes depression, depression increases the illness by lowering the body resistance: suggest to such a patient that he is improving in health and it will often happen that the stimulus of hope will cause such an increase in the resisting powers that the disease will be brought under control. The pessimist who dolefully and with shaking head injects drugs into his patients expects to get poor results, and he does get them.

In tuberculosis the same thing happens, and the spirit of hopefulness is of great help in treatment. The late Sir William Osler tells of a patient suffering from cancer of the stomach who gained three stone in weight in consequence of a consultation with an optimistic doctor, who assured him that he would recover. The benefit was only temporary in this case, but there are many diseases in which such an influence would have turned the scale; hence the splendid results which are sometimes achieved by Christian Scientists, advocates of Couéism, faith-healers and quacks of every kind. The truth is that hope is a medicine of enormous value, it can be generated by suggestion, yet the medical profession makes far too little use of this potent and inexpensive remedy. Like everything else it should be employed with discretion and intelligence; it can be a two-edged sword if carelessly handled. Take a patient who is suffering from neurasthenia and attempt to cure him by assuring him that there is nothing the matter. The patient knows better than you that such is not the case, and you have lost all chance of helping him. On the other hand explain to him the nature of his illness and the steps which will have to be taken for his cure, then suggest to him that he will steadily and slowly improve, the result will usually be entirely satisfactory. To sum up—suggestion is a cure for certain diseases, it is a valuable adjunct in many others, it ought to be employed with discretion in the handling of every patient with whom we deal, either to help in the cure or to make easier the downhill path which every human being has to tread sooner or later.

Dr. Nunan refers to the triumphs of Dr. Esdaile, who performed many major operations in Calcutta before chloroform came into use. But for the uncertainty and slowness of hypnotism it would probably be an ideal anæsthetic, especially if it were combined with local nerve blocking. Short of hypnosis which is suggestion in the highest degree, minor forms of suggestion play important parts in surgery as well as in medicine. The other day in the hospital ward the writer saw a child of four smilingly pointing to a vein in his arm and was surprised to hear that he was looking forward to his next intravenous injection. He regarded this as an interesting event. Here was an example of suggestion, his nurses and doctors had induced him to believe that the injections were commonplace events with the result that there was no howling or shrieking, but a happy little ceremony which was enjoyed by every one in the ward. In the same hospital a spleen puncture is submitted to in the same spirit as the taking of a dose of medicine, hence no struggling and no danger of damage to the spleen. The suitable use of suggestion makes a cataract operation far safer than it otherwise would be.

On the other hand doctors often unconsciously employ suggestion to the great detriment of their patients. Many patients have heart disease and other ailments "conferred" on them by their doctors, and tragic cases sometimes occur, such as that of a young man who committed suicide soon after a consultation with a conscientious doctor who found a hæmic murmur and had not the strength of mind to assure the patient that his heart was sound.

On one occasion the writer was asked by the Bengal Government to carry out a test of the efficacy of a new remedy for leprosy. Every effort was made to exclude suggestion, but the mere fact that injections were given was enough to influence the patients, with the result that decided improvement took place in a large number. Then as the patients realised that the improvement did not continue beyond a certain stage they began to fall away one by one, and the opinion formed was that the benefit was due chiefly to the improvement in appetite and

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spirits which resulted from the expectation of a cure by the new treatment. If suggestion had been employed deliberately as an adjunct to the treatment it is likely that better results would have been secured, but an impartial judgment could not have been formed as to the inherent value of the drug which was used.

There is ample evidence that the newer forms of treatment of leprosy are really effective, but the revolution in the outlook of the leper is not entirely dependent on drugs: it is to some extent due to the new spirit of optimism which pervades doctors and patients alike. If Dr. Muir were to confine himself to the injection of drugs and were to neglect the other accessory lines of treatment his results would be far from brilliant. Leprosy is the last disease which we should expect to be influenced by suggestion, yet this is one of the many factors which reinforce the drug treatment.

Hypnotism is not employed nearly so often as it might be. Doctors rightly feel that they are dealing with a potent agent which is capable of great abuse. It is extremely difficult for a medical man to adopt hypnotism as a regular method of treatment without falling under suspicion by his fellow practitioners and the general public. Even well educated men regard hypnotism as a form of charlatanism or as a supernatural agency, and the prejudice dies hard. Suggestion in the waking state is usually slower in its action, but in most cases, if employed with discretion and confidence, it can produce results little short of those obtained by hypnosis. We welcome Dr. Nunan's very interesting paper as it is certain to attract attention to a force which, rightly applied, will vastly improve our results. The advice to treat patients—not cases—is good, but on the other hand we hope that none of our readers will become mere healers by suggestion. Coué had many triumphs to his credit, but he sent many others to their graves, by employing suggestion as a panacea for all ailments. First make a sound diagnosis, then employ suggestion, usually as an adjunct to the other lines of treatment which are indicated, and in the rarer suitable cases as the one form of treatment.

SPECIAL ARTICLES.

PELVIC INFLAMMATORY DISEASES AND PYOSALPINX: DIAGNOSIS, PATHOLOGY, AND TREATMENT.

By V. B. GREEN-ARMYTAGE, M.D., M.R.C.P. (Lond.),
LIEUTENANT-COLONEL, I.M.S.,
Professor of Gynæcology and Obstetrics, Medical College, Calcutta, and Surgeon to the Eden Hospital.

SIR D'ARCY POWER used to say that there were four stages in the developmental career of a surgeon. In the first, he lost the fear of hæmorrhage; in the second, he ceased to multiply operations; in the third, he acquired the moral courage to stop in the middle of an operation, when he found the condition inoperable; and there is a fourth and final stage, which he never acquired absolutely, namely, the ability to gauge correctly the vital resistance of any patient; and yet on that depended the success of every operation.

These words, so full of wisdom, I intend to illustrate in this paper, for they are of peculiar importance to the gynæcologist, and particularly applicable to that most common gynæcological condition of the East, namely, pyosalpinx.

PYOSALPINX.

For the purposes of this paper I have taken the records of the Eden Hospital for the last five years. During this period 9,730 women have passed through the gynæcological outdoor department, and of these 1,324—or 13.6 per cent.—were suffering from tubo-ovarian inflammatory disease. In all, 512 patients were admitted into hospital: 373 of these women were operated upon, 269 by abdominal section, and 104 vaginally.

Of the 269 laparotomies, it was necessary to remove both tubes, and partially resect both ovaries in 206, with a mortality of 13 (6.3 per cent.).

In 63, total or sub-total hysterectomy together with removal of both tubes and ovaries was necessary, with a mortality of 6 (9.5 per cent.).

That is, in all, 250 were discharged cured or relieved, and 19 died (7 per cent.).

Of the 104 operated upon vaginally, in 99 posterior colpotomy was done with a mortality of 3 (3 per cent.). In 5 anterior colpotomy was necessary, with a mortality of 2 (40 per cent.).

That is, in all 99 were discharged cured or relieved, and 5 died (4.7 per cent.). These statistics teach us that the condition is very common, but of more importance are the principles upon which the treatment of all cases is based.

It must not be thought, however, that every case requires operation, for there is no question that a very large number of patients completely recover with moderate invalidism under medical treatment, and routine gynæcological methods such as rest in bed, radiant heat, douching, and the Hobb's glycerine technique with or without injection of 5 to 10 c.c. of skimmed milk into the muscles on alternate days for two weeks. But it must be remembered that patients in India do not seek hospital treatment until their condition is desperate, nor will they stop in hospital for any lengthy experience of medical treatment; moreover, should they have any recurrence of symptoms after a long stay in hospital, they abuse the hospital, and drift into the hands of quacks. What the oriental patient demands is early operation and a quick return to her home, with no chance of recurrence.

For this reason, in the East more patients get operated upon for this condition, or seek

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admission to hospital solely for operation, than in the West. The greatest clinical acumen, and the highest technical skill are necessary in dealing with these cases, for the surgeon has to decide both when and how to operate, and whether abdominally or vaginally. Moreover, occasion may arise in the most serious of these cases, when he may have to apply the third aphorism of Sir D'Arcy Power, that is having started abdominally, he may have to close the abdomen, and drain vaginally.

From a clinical standpoint, cases of chronic pelvic suppuration can be divided into two classes; *gonococcal* and *streptococcal*. The former is the cause in 80 per cent. of cases, the latter (if we exclude tuberculosis) in 20 per cent.

How can we distinguish these cases? For upon this, the operative treatment will depend.

Gonococcal class.—In this class the pelvic inflammation may be preceded by the usual evidence of gonorrhœa and the lesion be located in and around the tube and ovary; but *note well, that this inflammation does not involve the connective tissue (parametrium).*

Indeed, it may be taken as an axiom that a purulent inflammation beginning in a normal adult, non-puerperal vagina or uterus, which later extends into the pelvic cavity, is of gonorrhœal origin.

In some cases however there is no history of vaginal or urethral discharge, and yet a tubo-ovarian mass exists, accompanied with pain and bouts of high fever. In such an instance, if there is no history of abortion, or instrumentation of the uterus, one can assume that the cause is gonorrhœa, for negative bacteriological findings do not exclude gonorrhœa.

Saenger has shewn that the gonococcus can lie dormant in the lower part of the genital tract for a long time, and can extend upwards after labour or abortion. But it is of interest and importance to remember that a puerperal infection due to the gonococcus is always of a mild type. In all cases of puerperal gonococcal infection, without positive or recent evidence of gonorrhœa, the decision must rest on the location of the lesion, for the extension of gonorrhœal inflammation is invariably along the uterine mucosa, and further extension is towards the ovary and peritoneal cavity. Gonococci never extend through the uterine wall into the parametrium. To prove this, Schaefer injected pure cultures of gonococci into connective tissue, but no inflammatory reaction resulted. The characteristic lesion therefore of gonorrhœa in the pelvis is pyosalpinx, with or without oophoritis, and pelvic peritonitis.

Andrews examined 634 cases of pyosalpinx, and found that 55 per cent. were sterile, 22.5 per cent. contained gonococci, 12 per cent. contained streptococci and staphylococci, and 3 per cent. *B. coli*. Tubercle bacilli and other organisms made up the remainder.

As the gonococcus dies in one to four months, it is probable that all the sterile cases originate from the gonococcus. In the Eden Hospital, during the last five years, 95 per cent. of cases operated upon shewed no organisms on culture of the pus. Amongst the remaining 5 per cent. the following organisms were found in these proportions:—

B. coli ..	..	3 per cent.
Streptococci	..	1.4 per cent.
Gonococci	..	0.6 per cent.

The practical deduction is that in any case of tubo-ovarian mass, if there is no parametritis, one can safely assume that the gonococcus is the cause of the lesion. The only exceptions are those cases which appear to be gonococcal by virtue of the location of the mass, but which have occurred in or after the puerperium; but it should be remembered that streptococcal pyosalpinx without associated parametritis is extremely rare. Miller, who investigated bacteriologically more than 100 cases of pelvic inflammation at the Johns Hopkins Hospital, stated that he had never encountered a pure pyosalpinx due to the streptococcus.

Persistence of virulence.—All authorities are agreed that the gonococcus dies or disappears in from 3 weeks to 4 months after infection of a tube. Radical operation, therefore, should ordinarily be postponed till at least three months from the onset of the trouble.

There are two main reasons for waiting:—

1. Because a considerable number of these pelvic inflammatory masses disappear without operation, if nature and routine medical treatment are given a chance.

2. Automatic sterilisation and attenuation of the pus organisms is sometimes delayed, and then gonococcal pus may infect the peritoneum.

Hunner collected 39 cases of gonococcal peritonitis, operated upon within a period of three months, of whom 12 died.

Streptococcal class.—The distinguishing characteristics of streptococcal pelvic inflammation are (1) the apparent cause of the trouble, (2) the location of the lesion.

Apparent cause.—Nearly all streptococcal inflammatory masses in the pelvis can be traced to sepsis following labour or miscarriage. A few cases are due, however, to curetting, sounding, operations on the uterus, or cancer of the cervix.

It may, therefore, be laid down as an axiom that if a pelvic inflammatory lesion cannot be traced to one of the above factors, it is not streptococcal; consequently the history must be taken with great care. Remember that 20 per cent. of puerperal infections are gonococcal in origin, but whereas gonococcal lesions are limited to the tubes, streptococcal infections are parametrial.

In very rare cases there may be a mixed infection; if so there may be pus in the tubes above, and a parametrial inflammation below in the broad ligament. Such a condition is of immense importance to the clinician, for if he unwisely advocates operation, on the assumption that the tubes are gonococcal, he must perforce at the

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time of operation open up the broad ligament, and so flood the pelvic cavity with streptococci, which will cause general peritonitis and death.

Location of the lesion.—The streptococcus, unlike the gonococcus, does not progress along the mucosa of the uterus into the tubes, but penetrates the wall of the uterus, and extends into the connective tissue, causing parametritis. In severe cases, the infection may extend from the connective tissue to the peritoneum, causing peritonitis.

Whiteside and Walton endeavoured to produce streptococcal salpingitis by injecting into the uterus of rabbits pure cultures of streptococci and staphylococci. In no instance did salpingitis result. It is, therefore, almost certain that in the human being streptococci never cause pyosalpinx, but should the organisms happen to pass straight through the uterus and tubes, they may set up acute fatal general peritonitis.

Bumm and Cullingworth have laid it down that 90 *per cent. of all parametrial lesions are streptococcal;* in the remaining 10 per cent. staphylococci or *B. coli* are the cause. This fact is of the greatest clinical significance, for it warns the clinician of the risks of laparotomy where there is marked parametritis.

The distinguishing characteristics of a parametrial mass are—

(1) Its situation in the broad ligament, or pelvic fascial planes.

(2) Its intimate association with the wall of the uterus or pelvic wall, as though it were a part of these structures.

(3) Its low situation in relation to the uterus. It often comes far down the side of the cervix, or surrounds the rectum, or base of the bladder.

(4) Its dense hardness.

A tubo-ovarian mass of gonococcal origin, on the other hand, is distinguished—

(1) By its being situated high in the ovarian region, or being prolapsed into the pouch of Douglas.

(2) By its not being blended intimately with the uterine or pelvic wall.

(3) By its presenting the rounded outline of a distended tube or ovary.

(4) By its soft or semi-fluctuant consistency.

Persistence of virulence.—The virulence of the streptococcus persists indefinitely. Streptococci have been recorded as virulent after 6, 12, and 19 years. Automatic sterilisation, or attenuation of a streptococcal infection is so rare that no surgeon can rely upon it. This fact is of peculiar importance, for abdominal section in such a case may be followed by general peritonitis, therefore should the surgeon suspect that the cause of the abscess or inflammation is streptococcal, he should endeavour to operate extra-peritoneally, or by anterior or posterior colpotomy.

Sir William Jenner once said that success in the practice of medicine depended not so much on profound knowledge, as on a combination of three qualities, namely, kindliness, honesty, and the power of quick decision. The writer is of the opinion that there is no condition that calls more insistently for the display of these qualities than does that of pelvic inflammation in a woman.

Tubo-ovarian inflammatory disease must be considered in terms of pathology and bacteriology; for only on such lines can the clinician become a successful surgeon. Long operative experience has taught the writer, the following points of surgical importance, when dealing with these cases.

1. Avoid abdominal operations on patients with tubo-ovarian inflammatory disease secondary to abortion or labour, as these cases contain streptococci which may cause general peritonitis. It is imperative that a very careful history be taken.

2. If the history, or location of the disease, suggests gonorrhœal origin, operation may safely be performed three to fifteen weeks after subsidence of fever. If pus—even stinking pus—escapes into the abdominal cavity, during the operation, it should be mopped up, but there is no fear of general peritonitis in such cases, for the pus is sterile. In most cases the abdomen may be closed without any drainage. If preferred, the posterior fornix of the vagina can be opened from above, and a gauze drain inserted, to be removed *per vaginam* in 24 to 48 hours.

3. Wherever possible the ovary or a portion of the ovaries should be conserved, as much mental and physical distress follows complete extirpation of these organs.

4. When the tubes have been removed, and the ovaries conserved, it is important to suture the ovaries or remnants of them to the cornua of the uterus, so that they cannot prolapse into the pouch of Douglas.

5. The uterus should always be suspended or ventro-fixed to the anterior abdominal wall after these operations. If this is not done, it becomes retroverted, and adherent to the rectum, or the pouch of Douglas by the raw areas on its posterior surface, giving rise to dyspareunia, menorrhagia, and back-ache. The *omentum*—often called the "abdominal policeman"—should always be brought down to the pelvis and spread out over the operation area before closing the abdomen.

6. In a difficult case with many adhesions and double pyosalpinx, the surgeon must proceed with great caution, lest he tear such organs as the intestines, rectum, or bladder. The maxim "locate the fundus of the uterus, and the tubes and ovaries shall be delivered unto you," is a very sound one, for then the round ligament can be distinguished; a letter-box incision is made parallel with the round ligament, through which the surgeon, working along the planes of the broad ligament below the tube, can shell out the pyosalpinx.

It is very important to identify and securely ligature the infundibulo-pelvic ligament, before removing a pus sac.

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7. In some cases the pyosalpinx is adherent deep down in the lateral wall of the pelvis. In such cases in separating the tumour there may be severe bleeding from the deep pelvic veins, demanding very careful ligation. There is also a grave risk of injury to the ureter, with disastrous results, if it is not perceived in time. Should the ureter be torn or unwittingly cut during such an operation, time should not be wasted in attempting an anastomosis, but double ligature of each end should be done. If the proximal end is securely ligated hydronephrosis will not occur, although after-treatment in the matter of surgical anuria may give great anxiety.

8. It is a moot point in many of these cases whether it is not better to remove the uterus partially or completely, along with the tubes, for the infected organ without these structures is useless, and when retained, is often a source of dysmenorrhœa and menorrhagia. Out of 373 cases in the Eden Hospital, in 63 partial or complete hysterectomy was done. The decision to remove the body of the uterus should be made at the commencement of the operation. It will be found easiest if the surgeon begins on the least affected side; he first ties off the infundibulo-pelvic ligament, and then works along below the pyosalpinx, to ligate the uterine artery. Next he cuts across the cervix, and ties the uterine artery of the opposite side, and proceeds to shell out the other pyosalpinx, between the layers of the broad ligament.

9. Tubo-ovarian inflammatory disease is extremely common in the East, and the condition of many of these patients at operation is at times incalculably severe, that is masses of bowel adhesions and old inflammatory deposits completely obliterate all anatomical points, rendering any surgical procedure hazardous. In such a case, the gynæcologist should remember the third maxim of Sir D'Arcy Power, and if need be bravely close the abdomen without doing further mischief. It requires very considerable moral courage, combined with great clinical acumen, to desist.

The writer, like other surgeons no doubt, has had regrettable tragedies from not bearing that aphorism in mind and attempting the impossible. Vaginal drainage to liberate the pus, he feels sure, would have saved the lives of some of these women.

10. The appendix should in all cases be removed, as part of the operation, for if it hangs over the brim of the pelvis it may become adherent to the inflamed pelvic area after operation, and then give rise to symptoms, which at a later date are difficult to distinguish between those of a chronic appendix, and old pelvic adhesions.

11. The leucocytosis which accompanies suppuration is a valuable diagnostic sign. A leucocyte count of less than 10,000 excludes suppuration. A count from 10,000 to 15,000 does not necessarily indicate pus, for in the reparative process of absorption the white blood cells are increased. A count above 15,000, however, invariably indicates pus. Leucocytosis is particularly valuable in the afebrile cases. The writer has seen many of these women where the white blood cell count has reached 25,000, with practically no fever.

12. A colpotomy should be done in all cases where it is evident that the inflammatory exudate is bulging into the anterior or posterior fornix of an œdematous vaginal wall. In the former case there will be great dysuria, and in the latter there is a mucoid discharge from the anus. Operation should be performed as soon as possible to forestall bursting of the abscess into the bladder or rectum. There should be no douching of the pus cavity, but merely a gauze drain inserted. Occasionally, in doing an anterior or posterior colpotomy, only infected peritoneal fluid runs away, and on inserting a finger the bulging pus sac can be felt high up. If this is so, this sac should be opened and drained, but not douched until two or three days later. The writer follows an old time technique of swabbing out such a cavity with several strips of gauze soaked in turpentine. This lessens hæmorrhage and stimulates repair. Occasionally this primary pyosalpinx above the exudation in the pouch of Douglas or utero-vesical pouch cannot be reached at first, but can be so reached in two or three days time. At other times, after opening the pouch, and letting out the thin serous peritoneal exudate, it will be found that the temperature and all symptoms subside. The explanation is that the organisms in the pus sac die and it becomes sterile. The pyosalpinx later becomes palpable high up in the pelvis. In such a case gonococcal infection is certain, and abdominal operation can be safely performed at a future date. Remember, it is never safe, unless the condition of the patient is desperate, to do an abdominal operation during the acute period, and that vaginal drainage is the best method of relieving the peritoneal cavity of infected fluid, for in a fulminating case it may not be possible to differentiate between a gonococcal, streptococcal, or a mixed infection. In such circumstances the patient will be extremely ill, the whole abdomen generally distended, rigid, and painful, and the pulse very rapid, and temperature high.

In gonorrhœal infections, the symptoms will subside under medical treatment in 90 per cent. of cases; whereas in streptococcal ones, operation or no operation, the patient will die. Possibly in 10 per cent. of gonorrhœal cases operation will become imperatively necessary because of obstructive symptoms, or tympanitic ileus duplex, due to bursting or leaking of a pus sac. The writer has done many of these. If the surgeon is quick and able to dam off the intestines, and remove the offending pus sacs, it is remarkable what a large measure of success he will meet with, in what would appear a hopeless condition.

Suprapubic and vaginal drainage greatly add to the chances of recovery.

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13. In chronic cases of pelvic suppuration it is not always easy to decide whether to operate abdominally or vaginally. The writer is of the opinion that if the leucocyte count denotes pus, and there is a tense hard mass filling the pelvis, felt *per vaginam* and *per rectum*, incorporating the body of the uterus, so as to make this organ indistinguishable, it is best to pass a sound, and then do colpotomy, for nothing is more distressing than to open the abdomen in these chronic cases, and in the attempt to remove the old inflammatory mass tear the bladder or rectum, for though the operation may be a complete success, the patient may die. If on the other hand the abscess is in the broad ligament, it can be reached and drained by colpotomy just as easily.

14. The post-operative treatment in cases of tubo-ovarian inflammatory disease is to place the patient in Fowler's position and administer continuous rectal saline by the drop method (9 ozs. saline, 1 oz. glucose); to give nothing by the mouth except sips of water and a lime to suck. Pain is relieved by morphia or aspirin. The mouth is kept clean with a glyco-thymoline mouth wash. Cathartics should not be given until the third day. Distension can be relieved by turpentine or fœtid enemata, together with eserine and pituitrin hypodermic injections. Severe vomiting should be relieved by stomach lavage.

15. In some cases of tubo-ovarian disease remember that though the physical signs are typical, there may be no history which can attribute them to any infection, gonorrhœal or streptococcal. These cases are seen in women, usually over 30, with a history of sterility, menorrhagia, and late dyspareunia. Formerly these cases were thought to be of chronic inflammatory origin, but they have been proved by the pathologists in recent years to be endometriomata which necessitate operation in the majority of cases, because they form tumours or hæmorrhagic cysts, which encroach upon the pelvic viscera, endanger life, or cause chronic invalidism.

16. As regards the prognosis of tubo-ovarian inflammatory disease, it must be admitted that medical measures have their victories, partial or complete, but these involve much time, expense, and invalidism. Occasionally after one or more attacks of so-called pelvic peritonitis, which have been cured by medical means, the question of future child-bearing arises. A woman who has suffered from merely catarrhal salpingitis undoubtedly can conceive, for if there is no palpable adnexal disease a Rubin test may demonstrate the patency of the tubes, but should she have suffered from a gonorrhœal infection, even of the mildest type, it is very questionable whether she will ever become pregnant, for frequently nodular salpingitis will be found on opening the abdomen, though vaginal examination could discover nothing.

Curiously enough, although symptoms of pelvic peritonitis are very common after a septic abortion or as part of puerperal sepsis, such women very frequently become pregnant again. The explanation of this, of course, is that streptococci pervade the parametrium and give rise to the symptoms of so-called pelvic peritonitis, but since such inflammation is extra-peritoneal the tubes and ovaries do not become glued together, and hence the ovum can reach the uterus.

Amongst Indian or European women in the tropics, the anæmia of menorrhagia, the constant pain of the periods, the recurring attacks of high or low fever, and the chronic pelvic ache and discharge, all combine to make them seek early operative relief, for tropical conditions greatly enhance invalidism.

I am greatly indebted to Captain K. Dutt, the Registrar of the Eden Hospital, for the care and trouble taken in collating the case histories and statistics on which this article is based.

SUGGESTION AS A REMEDIAL AGENT.*

By DR. WILLIAM NUNAN, B.A., M.D.,

Police Surgeon, Bombay, and Professor of Medical Jurisprudence and Toxicology, Grant Medical College, Bombay.

I NEED hardly say how honoured I am by the opportunity afforded to put before you some facts regarding the use of the human mind in the treatment of the human body and the ills to which that is heir. The attitude of incredulity, and even of hostility, to the claims made by those who practice suggestion in their daily work—claims which can easily be substantiated by examination of the evidence—is understandable in the case of the man in the street, but is deplorable in the case of the medical profession at large.

The attitude of the average man, including the average medical man, reminds me of that instructive and amusing picture in *Punch*:—An inebriated club-man, with his opera hat on the back of his head and tie hanging awry, is depicted standing unsteadily before a fish monger's shop, in the window of which, disposed on a marble slab, lies the glistening body of an enormous salmon. The genial toper, gazing at the mighty fish is saying "I don't believe it—the man who caught that fish is a d — d liar." In the results of suggestion-therapy, some people, including members of our profession, refuse to believe the evidence of their own senses, while others refuse to examine the evidence at all. *To the man who has not examined the evidence there is no evidence.* This is an axiom in law.

When Galileo invented the telescope, his contemporary scientists said he was mad and refused to look at the stars through the devilish contrivance. Such mental attitudes change with time by force of circumstances, and the facts of suggestion cannot be set aside by those—and they are all too many—who exclaim "Rubbish" when told of the results of treatment.

I will put forward to-day no statement that I cannot substantiate, and I propose to give you ocular evidence of the power of mind over matter.

I make no claim that suggestion is a cure-all. There are a vast number of cases that it will not benefit at all. In many instances, it will benefit an individual A, while it will fail to relieve B, suffering in a precisely similar manner, since it is a matter of receptivity. I do not propose to spend much time in theorizing, and perhaps it will be the best plan to set forth in some detail the treatment of a few out of many typical cases of physical, mental and physico-mental ailments in which the results were in my own personal experience outstandingly satisfactory, before I deal with the mental machine

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* Being a paper read before the Poona Medical Society on February 12th, 1927.

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and its proper usage in the treatment of disease by direct and by indirect suggestion.

Case No. 1.—On January 6th, 1926, I was consulted by a young man, much depressed, whose face was covered over the beard area with a multitude of flat-headed pustules which, here and there, had coalesced, so that the entire face over the beard area seemed one superficial and disgusting abscess, or series of abscesses. I asked for the history of the case, and the patient said he had contracted "barber's itch" in Zanzibar two years before. He had tried all kinds of remedies, local, vaccinal and constitutional, while the condition became worse and worse. He was very much worried, and though I had little hope of curing the condition where a galaxy of skin-specialists, Dutch, British, Indian, Portuguese, and French from Cape Town to Bombay had more than failed, I said to him "This thing has got on your nerves. You have not been able to shave for two years, but as you stand at the glass clipping your beard in the morning with the scissors, you look for new pustules, and examine the condition of older ones. In the train on your way to office, you think that your fellow-travellers are edging away from you in disgust. In office you think that your fellow-clerks avoid you on account of the appearance of your face. In fact the condition is never out of your thoughts, and you fly from doctor to doctor, and from proprietary remedy to proprietary remedy, as described in the all-pervading advertisements, without any real hope of betterment, but with a more and more settled conviction of failure." He said "You are reading my very thoughts. I am in despair. What am I to do? I cannot sleep for worry. Can you help me?" I replied, "I make no promises, I guarantee nothing, but I will do my best to distract your thoughts from your condition, so that you will not worry. In the absence of worry, your blood will get a chance to remedy the trouble."

He looked incredulous, and asked "Will you not give me some medicine?" I said "To judge from the history you have given me, you have apparently exhausted the *Pharmacopœia*. We will now try what your mind can do to help you if you are willing." I placed him comfortably in an armchair, asked him to relax his muscles, close his eyes and rest. I said, "You may listen to me, or not, just as you like. It will perhaps be better if you do not go out of your way to listen, but allow yourself to fall into a brown study, or after-lunch Sunday-afternoon state of lassitude, or at any rate placidity. I do not ask for faith. I merely ask you to believe that I am not making a fool of myself and of you." When these instructions had been carried out, I began to speak to him somewhat as follows:—"I admit that you have had a bad time. You have felt humiliated and ashamed and distressed during these two years, and you have lost faith in drugs and doctors, and what is infinitely worse, you have lost confidence in yourself.

"I suggest that from now onward, you will not be able to worry about your face. You will sleep well to-night and every other night. This will result in a tremendous conservation of vital force and of nerve energy and your own normal bias towards health will clear up your face."

I continued in this strain for a few minutes. To be frank, I felt a bit doubtful of success in this long-standing case and I felt compelled to play for safety by adding "I promise no miracles. Your face will improve slowly as your worry lessens, and you will get into a healthy circle instead of the unhealthy circle in which you have been for two years." I then asked him to return the following Monday, 11th January, 1926, i.e., five days later, to report progress.

On his arrival, sharp to time, I found to my agreeable surprise, that the condition of the young man's face had improved beyond my wildest hopes. He was cheerful, happy and smiling. The pustules were drying upon his face and no new ones had appeared. The patient was jubilant, and said, "I am going to be quickly cured." I once more felt bound to warn him not to expect too much.

The patient was sanguine of success, which was of course all to the good. He said, "My mother and sisters are wild with joy. I have used lotions, creams, ointments, tonics, injections, etc., etc., and my face grew steadily worse. It has steadily improved during the past few days, and I sleep all night."

I continued the curative suggestions, and on his return 4 days later (i.e., 15th January) for the third treatment the pustules had dried off in scabs; the patient was happy and healthy looking, though, as he said himself, his face was rough and red. I said to him "Your face will be always rough on account of the constant scarring of ruptured pustules. Your face is still red, owing to the dilatation of the capillaries in the prolonged inflammatory condition, but the redness will slowly disappear as the blood vessels contract." I saw the patient again on the 25th January, on the 2nd February, and finally discharged him as definitely cured on the 20th February, 1926. The sequel is recent and interesting.

On January 14th 1927, i.e., eleven months after conclusion of treatment, the patient, or rather ex-patient, called for a certificate of fitness for service in East Africa. His skin was rough, that is, pitted, but normal in colour. He shaves daily, never has pustule, and is radiant with happiness. He sailed next day to take up his post in Dar-es-salaam.

Case No. 2.—An employee of the Bombay Port Trust Railway, aged 50 years, came to my office at 4 p.m. on 25th January 1926, in a most depressed and tremulous condition. He had lost his eldest son, aged 19 years, three months before, and had not slept well since that time.

His condition had grown steadily worse, his appetite was lost, tremors of the hands and lips became noticeable, and there was such inability to concentrate and attend to his work, that the head of his department had insisted on his applying for leave as he was useless in the office.

I signed a certificate recommending two months, leave out of Bombay for rest and recuperation, but I asked him if he did not think that he would be worse off mentally when he had the whole day (without work) in which to think of his troubles.

He replied "I fear so, but the manager has insisted on my going away, as he says I am of no use, and am in danger of losing my employment, if I do not pull myself together. What am I to do?" I replied "Here is your certificate for leave. You need not come back to me unless you wish to do so. I have no time to carry out my plan at the moment, but if you return to this office at 6 p.m. I will be able to help you, and you will thank Heaven you came back." Two hours later, I found him waiting in my outer office. I called him in. I said to him "If I begin to talk to you as you sit opposite to me, and tell you that your mental distress is leaving you, and that you will be happier in future and that you will sleep to-night and every other night, your hostility will be at once aroused, because your reason tells you that you have been in hell for the past three months, and that you are getting worse instead of better. I propose therefore to make no frontal attack. I ask you to do nothing to help me in this matter. I ask you merely to try to believe that I have not called you back here to let you see me making a fool of myself, or of you. I have no time to do the one and I cannot afford to do the other.

I ask you to open your collar and your belt and to sit in this armchair as comfortably as you can dispose yourself, closing your eyes, relaxing all your muscles, as you would on the afternoon of a holiday, when you are too lazy or too somnolent to read." When these instructions had been carried out, I began to talk again, "For the past three months you have been bemoaning your sad fate, and you have been indulging in the luxury of self-pity. You have been forgetting that you have a job to mind, a wife and children to support, a duty to your employers. From this time onward, you will begin to emerge from this slough of despond. To-night at 10 o'clock, you will begin to feel sleepy,

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and when you go to bed you will sleep quickly, and your sleep will be prolonged and healthy. To-morrow you will feel much better in all respects and you will return for treatment." He went away rather incredulous and in fact obviously inclined to be amused, though too polite to say so. I said "You are amused. Never mind, that is all to the good. It is at any rate, the first time you have been amused for three months. Later on, we will laugh together."

26th January. The patient arrived in a most cheerful frame of mind. He said "Last night I began to feel sleepy soon after dinner. Hitherto, I have been afraid to go to bed before midnight on account of insomnia. Last night I went to bed at 9-30 p.m. and slept soundly until 5-30 a.m.; after that I was restless, but I feel ever so much better. My wife feared that you had drugged me, as I have not slept more than two or three hours every night for the past three months."

Curative suggestions were given once more—suggestions of good nights and good days, cheerfulness, self-confidence, energy.

Third treatment. 27th January. The patient is bright and cheerful, and looks years younger. He left this evening for Bangalore to enjoy his leave. He was now sleeping 7 or 8 hours nightly and was congratulated at his office, when he went to draw his pay, on the great improvement in his appearance. I heard no more about this patient until a month after his return from leave, i.e., in April, 1926. He then came to my office by order of his work manager to consult me regarding a chronic form of diarrhœa from which he had suffered for over a year. He was then undergoing a course of treatment by injections from a specialist. I asked "Why did you not mention this complaint before"? He replied "Because I did not think suggestion would do me any good in this matter."

I said "At any rate it cannot do you any harm. I have no desire to interfere with your medicinal treatment, but I will give you curative suggestions, and your medicinal treatment will be aided." I asked him to return one week later to report progress. He arrived in great glee, and said "I am having formed motions for the first time for a year." I asked him to come back again after a week, but he did not do so. A few weeks later I met the manager of the Port Trust Railway, and asked him why the patient was not coming to see me. The manager was angry and said "I gave him strict orders to attend at your office until he was officially discharged by you." I said "Perhaps the treatment by suggestion is doing him no good," whereupon he said, "That is not the point. You have made a different man of him, regarding his depression, his tremors and his insomnia. You have saved him from dismissal, and he must not be ungrateful." A few days afterwards, the patient came to my office and said "I am sorry I did not return to see you. I meant no discourtesy, but you are a busy man and I did not wish to waste your time, as I am completely cured. I have no need of further treatment of any kind." He has had no relapse in the past ten months.

Case No. 3.—A firm of ironfounders asked me to treat one of their most useful employees, who had been a drunkard for over 20 years but who was now getting beyond his usefulness on account of his unreliability in the matter of drink. I asked the patient, a powerful Mussalman, if he wished to be cured, because few drinkers desire to be cured. He replied "My job depends upon it. I have a wife and family to support, I know that alcohol is ruining me, that I have lost the power of refusing drinks, which are constantly offered to me in the course of my work."

I treated this man on six occasions in May, 1926. On the 25th December, 1926, I met his works manager, who said to me "I have had no trouble with Hassan since his first visit to your office."

Case No. 4.—A Muslim boy speaking no English, aged 12 years, was expelled from his school in 1925, and admitted to an orphanage early in 1926. In April 1926, the Secretary of the orphanage and the boy's father came to ask me to certify the boy to be insane. I refused to do so, and the father said "Well then, please have him admitted to the reformatory, as the orphanage refuses to keep him, and I cannot manage him." The Secretary said "He steals everything he can lay his hands on, he is a liar, he teases the other boys, will not learn his lessons, has run away several times, and is a bad example to the others. We cannot keep him any longer." I said "Bring the boy to me every day for a week, and I will try to change all that."

I treated the boy next morning, first asking him why he stole. He replied—*Humko ata hai, Sahib.** Speaking in my best Hindustani, which is extremely bad, I gave the boy suggestions which were contrary to his proclivities. After five minutes, I asked him to sit up and tell me how he felt. He said smilingly *Sir thanda hai, Sahib.*†

On the third occasion he was brought by a senior boy, who stated that there was 14 *anna* (*sic*) improvement, and then I saw him no more.

Six months afterwards, I met the Secretary, who said the boy had improved so much, that his father had taken him home. He said "He never complained of headache after leaving you. Before, he had constant severe headache (*N.B.*—I had been told nothing of this). We tested him on several occasions by leaving money and other valuables lying about. He always returned them to his teachers. He has been attentive and intelligent in class, and proved quite a likeable little chap. I would like you to take on another case for me, as we are all impressed by the success in this case. He became a different boy almost at once."

Case No. 5.—On the 17th September 1926, a young European woman, aged about 20 years, was sent to Bombay for *x*-ray examination and, if necessary, operation for treatment of the following phenomena:—For the past two and a half years she had been vomiting daily, and for the past year she had not slept at night without bromide or other sedatives. She had been treated with bismuth, pepsin, etc., and with sedative drugs, official and proprietary.

It was then proposed, medical treatment having completely failed, that the surgeons should get a chance "to have a look inside" to see what the trouble was, their investigations to be preceded by *x*-ray examination. The patient came a 200 miles journey to Bombay to stay with her married sister, whose husband sent the patient to me, saying "Dr. Nunan will know where to take you for *x*-ray examination, and will know where to send you for the operation."

As you see, the necessity for operation was assumed; I examined the patient very carefully, and noticed that she complained of pain, not wherever pressure was applied, but in some other area, which in turn, was not painful under palpation. I asked her if she had been on milk diet during the past two and a half years. She replied "Milk always makes me sick." I asked "But do you not take milk in your tea and coffee?" She replied "No, I must take condensed milk, as ordinary milk would immediately cause vomiting." I sent her out of the room, and I said to her mother, "There is nothing physically wrong with your daughter. She *expects* to be sick, and therefore she is sick daily." The mother was indignant and pointed out the multiplicity of different opinions and the prolonged treatment by drugs. I replied "Exactly: each failure to relieve has driven the matter more deeply into your daughter's mind, and incidentally into yours." To shorten the story, I treated the patient on five occasions by suggestion. After the first treatment the patient went to Mongini's tea rooms, had ordinary milk in her tea, went home, ate a good dinner, slept all night without drugs, and came to my office next day happy and smiling, stating "I am cured." Her mother insisted on her remaining in Bombay for the rest of the week and I saw her five times in all. Her health and spirits improved daily and I discharged her as cured on the 29th September 1926. After Christmas, 1926 she wrote

* Literally "It comes upon me" or "I can't help it."
† "My head is cool."

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to me (i.e., four months after treatment) "I am perfectly well, I have a tremendous appetite and am inclined to get too fat. I sleep well and have taken no medicine since I saw you. I danced 28 dances at our Xmas dance and played two sets of tennis before I went to the dance. All my family and friends are amazed." I met the patient's sister on the 5th February, 1927. She said "It is a regular miracle. She eats well, sleeps well and is, if anything, too lively." What was the diagnosis? In my opinion the case was one of nervous pylorospasm (anorrhexia nervosa). The girl, during the war, had witnessed about twenty German air raids at Hull, on the East coast of England. You can link up the chain of evidence for yourselves.

Case No. 6.—The Manager of the Eastern Telegraph Company telephoned that one of their principal accountants had been in bed for six weeks, suffering from an injury to his ankle, and asked me to visit the man and send him to hospital if I did not think he could resume duty at an early date.

I found an indolent ulcer on the right internal ankle—the granulations being exuberant and pale, bleeding easily. There was a history of an injury nearly two months previously. The patient said, "My ankle refuses to heal. It scabs over, but if I walk across the room it breaks down again. The manager is worried at my absence from office. My work is accumulating. This thing is getting on my nerves."

I said "I will take it off your nerves and your ankle will heal." I explained my methods, and the patient was intensely amused. I said "You are not alone in your amusement. Most people think suggestion is a joke, but if you listen to me, we will afterwards enjoy the joke together." I proceeded on the usual lines of curative suggestion in the waking state, and returned next morning—(*N.B.*—exactly 24 hours after the first treatment)—to find the patient puzzled. He said "It is an extraordinary thing, but my ankle looks better." I removed the dressings, which had not been altered, being merely boracic acid lint which had been used for six weeks, and saw a healthy granulating surface. To shorten the tale, the patient returned to office on the following Monday morning with the ulcer completely healed, enthusiastic on the subject of suggestion.

Case No. 7.—A police officer, European, whose hands had been covered with eczema for three years was completely cured in three weeks—all medical treatment having failed.

Case No. 8.—An ulcer (the size of a rupee) on the elbow of a girl brought to me by the League of Mercy about four months ago healed in ten days. The ulcer had lasted for two and a half years. The girl was brought to me primarily for treatment for kleptomania, untruthfulness, bad temper, and insomnia, and the treatment of the ulcer was incidental, as I was not consulted on the matter in the first instance, but had asked why the elbow was bandaged. At the second visit, the sister in charge said to me "It is an extraordinary thing, but the ulcer looks better."

The improvement continued daily, and the epithelial covering was complete in ten days and strong in three weeks, no change having been made in treatment (boracic acid lint). The mental and moral condition improved even more rapidly. The girl is now quiet, obedient, industrious, and happy, sleeps well at night and is very grateful for what has been done for her.

I do not propose to weary you with further clinical details. I have perhaps said enough to convince you of the utility of suggestion-therapy in a number of varied cases.

I need hardly point out that success is dependent upon the reception of suggestions by the patient. Looking over the list of cases treated by me, I find the word insomnia recurring frequently. Insomnia may be caused by mental or by physical pain or distress. Remove the pain, and the insomnia is often cured, in spite of the fact that the cause of pain still exists.

This should not prevent us from using suggestion, no more than we refrain from treating pain under many ordinary circumstances by, say, hypodermic injections of morphia, remembering that the hypodermic syringe may be a dangerous weapon, if used ignorantly, without proper diagnosis. Again and again in my index I find such words and phrases as "nervousness, business or domestic worry, fatigue, depression, irritability, diffidence, self-consciousness, debility, recurring headache, precordial pain, palpitation, chronic diarrhœa, tremors, paralysis, obsessions, dipsomania, kleptomania, chronic skin diseases, nervous breakdown, palpitation and pain in the heart, vomiting of pregnancy, dysmenorrhœa, neuralgia, impotence." Such cases are mostly amenable to suggestion when the patient desires to be cured. The important point to remember is that practically all my successful cases had consulted me as a last resource, after ordinary—I will not say orthodox—treatment had completely failed.

While admitting that the mental factor in any disease increases with the lapse of time, the rapidity of relief and cure in many cases is significant and leads to the belief that the use of suggestion in many cases is needlessly delayed.

I will now proceed to demonstrate the method of treatment by suggestion, reminding you that the sleep state is induced here merely for demonstration purposes, and is not ordinarily necessary for cure. The sleep state is more often than not unattainable, but is invariably, as one would expect, beneficial to mind and body; for how does that great psychologist, William Shakespeare, refer to sleep?

> "Sleep that knits up the
> Ravell'd sleave of care,
> The death of each day's life,
> Great Nature's second course,
> Chief nourisher in life's feast."

* * * * * * * *

Dr. Nunan then gave practical demonstrations in suggestion-therapy, including the induction of sleep, and the procuring of surgical anæsthesia. He reminded the audience that Esdaile of Calcutta used suggestion for the induction of anæsthesia (before chloroform was discovered by Simpson) in hundreds of major and thousands of minor operations, including 167 cases of elephantiasis of the scrotum, and in his extensive obstetric practice. He advocated the extension of the use of suggestion (in the waking state) in general practice.

THE IMPERIAL FUNCTIONS OF THE HOSPITAL FOR TROPICAL DISEASES, LONDON. AN APPEAL TO INDIA.

By F. A. LYON.

(WE have been asked to publish the following appeal by Mr. F. A. Lyon. We gladly do so as it is an excellent appeal in an excellent cause. Of course we do not accept responsibility for the opinions which are expressed; indeed we do not agree with everything that is stated by Mr. Lyon. There can be no two opinions, however, as to the splendid work done by the London School of Tropical Medicine and the Hospital for Tropical Diseases, Endsleigh Gardens, and we most heartily commend to our readers the cause for which the appeal is issued.—EDITOR, *I.M.G.*)

So long as London remains the focus of the world's commerce and the nerve centre of a great tropical Empire, it is an imperial necessity that there should be in the metropolis an institution where the study and treatment of tropical diseases can adequately be carried out. Upon nothing so much as upon bodily vigour does tropical colonisation depend for its success: it is the basis of pioneer work in the exploration of unchartered regions in search of oil and other minerals and in the transformation of jungle land into rubber plantations and tea gardens and the cultivation of other tropical commodities: it is indispensable alike to the missionary, to the soldier and to the official who in isolated regions executes the functions of British government.

Any body which undertakes the responsibility of maintaining the health of the white man in the tropics must be alive to three distinct aspects of its work. It

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must enjoy the devoted service of physicians and surgeons who have made the study of tropical medicine their life work; time and again valuable time is wasted, sometimes good health permanently impaired without necessity, by the inaccurate diagnosis or inexpert treatment of a tropical disease. It must provide the means of adequately instructing in the cause and treatment of tropical maladies those destined to follow medical practice in the tropics, since to allow men and women to go forth for this purpose inadequately equipped is little less than criminal. It must maintain a centre to which may turn all those who have fallen victims to these diseases and are thereby prevented from carrying on their work.

It will readily be appreciated that the foundation upon which each of these three functions is based is a hospital. In such an establishment is found that multitudinous variety of cases in the course of treating which the medical staff are led on step by step to the evolution of new forms of treatment, to new discoveries in the cause and progress of diseases as yet not fully comprehended and so give forth to the world fresh chances of immunity from the attack and of release from the hold of these enemies of the human body. Only in the wards of a hospital is there concentrated that clinical material so vitally necessary to the instruction of medical students; books, lantern lectures, microscopes and all the apparatus of a modern laboratory are unavailing without practical experience at the bedside. No medical practitioner, be he never so skilled, has personally at his disposal the many requisites for the treatment of serious illnesses. These are to be found only in a hospital which is properly equipped with up-to-date apparatus and staffed by nurses who have undergone years of training in the care of the sick and in addition have received special instruction in the nursing of tropical cases.

How far has the Hospital for Tropical Diseases, Endsleigh Gardens, London, fulfilled these demands in the past; and is it worthy of encouragement to continue its present activities? We will be content to recount facts.

The study and treatment of tropical disease is for ever associated with the name of Sir Patrick Manson, for it was he who, after twenty-five years in the Far East during which time he made discoveries which have changed the very face of the world, caused tropical medicine to the regarded as a separate branch of medical science. The detailed history of his discovery of the life-story of the *Filaria bancrofti* and its embryos, of his enunciation of the mosquito-malaria theory which alone guided to success the experiments brought to such wonderful fruition by Sir Ronald Ross, and the exposition of his many other discoveries will be found in the *Life and Work of Sir Patrick Manson*, now actually in the process of publication. We are more closely concerned here with Manson's organisation and direction of those forces which he martialled in order to ensure the future progress of these labours to which he himself had devoted his whole life. The opportunity to give effect to his plans came in 1897 when he was appointed Medical Adviser to the Colonial Office by Mr. Joseph Chamberlain, and immediately that greatest of all colonial secretaries gave Manson his whole-hearted co-operation in placing upon a fixed basis that work so patently beneficial to the welfare of the Empire overseas. Some years previously Manson had joined the medical staff of the Seamen's Hospital Society because it was only in the wards of the Dreadnought Hospital, Greenwich and its branch in the Albert Docks that he could find the cases of tropical disease by treating which he could continue his researches. For the same reason the London School of Tropical Medicine, founded by Manson and Chamberlain, was located at the Albert Dock Hospital, and its affairs administered by the Seamen's Hospital Society. From out of the wards and laboratories of this institution, tucked away amidst the wharves and quays of the London docks, men have gone to every quarter of the globe bestowing upon the sick the fruits of their knowledge, gathering in the fruits of experience. Since the end of last century this Society, which for over one hundred years, with the aid of voluntary support, has afforded free treatment to all merchant seamen and has thereby maintained the health of the mercantile marine, has fostered the study of tropical medicine and borne the financial burden of the treatment of sufferers from tropical diseases. If Manson be called the "Father of Tropical Medicine," then the Seamen's Hospital Society may claim to be its Godfather. For twenty years the Albert Dock Hospital with the School attached to it was the centre for the study and treatment of tropical diseases until at the conclusion of the War the British Red Cross Society enabled the Society to transfer this branch of its work to the Hospital for Tropical Diseases, Endsleigh Gardens, Euston, while a special fund raised by the late Lord Milner furthered the activities of the School in the same building. In 1924, the London School of Tropical Medicine was amalgamated with the new School of Hygiene under the terms of a munificent gift from the Rockefeller Foundation and thereby has been opened for it a wider scope of activity than ever before.

The Hospital for Tropical Diseases, the centre for treatment, still remains, however, an integral part of the Seamen's Hospital Society and being therefore dependent financially upon voluntary support, it is on this account that a member of the Society's staff, Mr. F. A. Lyon, has been sent on a mission to India and Ceylon. Let us examine how far this hospital as at present administered fulfils what have been suggested as the requisites for a centre in London for the treatment of tropical diseases. Its honorary medical staff is composed of men whose repute in this branch of medical science is well known in India and throughout the tropics. Since the war the advances made in the treatment of tropical diseases have been many and striking. These advances have for the most part been connected with the use of drugs which have been elaborated in the chemical laboratories of European countries and much of the painstaking and laborious task of assessing the value of these new compounds has been fulfilled at the Hospital for Tropical Diseases, London. Up to 1918 the efforts to destroy the trypanosome which engenders the deadly sleeping sickness had been based on the use of poisonous metallic drugs, but an aniline compound known as Bayer 205 is now taking their place. In 1920 its action on animals was known but it had not been applied to the human body. Almost the first cases among Europeans were injected and studied in the Hospital in Endsleigh Gardens. The results of the injection of this drug in the first ten cases were so successful and the cures took place with such astounding rapidity that the further utilisation of the drug on a large scale in the tropics was made possible with the results which are now known.

The analysis of the quinine molecule and the embodiment of its active principle in the substance known as Quinolin has, after judicious manipulation, resulted in the evolution of the compound known as Plasmoquine, which is many times more potent against the malaria parasite and of which the results are permanent. The part privilege of observing the effect of this drug on man has fallen to the lot of the Hospital for Tropical Diseases, London, and it has been possible to confirm the peculiar action of Plasmoquine on that stage of the malaria parasite which undergoes development in the mosquito and to confirm the important observations made in Hamburg. The significance of this discovery will be readily appreciated by those engaged in suppressing malaria. For the emetine treatment of amœbic dysentery we are originally indebted to Sir Leonard Rogers. The compound emetine-bismuth-iodide has been found, especially from 1918 onwards, to be applicable for the treatment and cure of the chronic state of the disease. But not all cases are so favourably influenced: in some the parasite seems to have developed a resistance to the action of the drug with the result that the disease recurs in an aggravated form. It has been found that combination of

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quinolin with sulphonic acid, the oxyquinolin-sulphonic compound known as Yatren, has, when injected into the bowel, a destructive effect on the parasite of amœbic dysentery and incites also a rapid regeneration of the diseased bowel. The preliminary experiments on this drug were carried out in the Dutch East Indies and its intensive application has been made in the Hospital for Tropical Diseases, London, where it has been found to have an almost equally satisfactory action on other forms of ulceration of the large intestine and thereby sufferers from various forms of colitis have been given great relief. Much attention has also been given to the diagnosis and treatment of the chronic form of bacillary dysentery. By the use of the sigmoidoscope the varying appearances of the bowel have been studied and illustrated so that it is now possible to ascertain the exact state of inflammation and the degree to which irreparable damage has progressed. Many of the slighter cases of chronic bacillary dysentery can be successfully treated by means of Yatren lavage, but the more severe forms require surgical treatment. For this the bowel is opened over the cæcum so that the intestinal contents escape from the wound and the diseased large intestine is set at rest when it will recover by a process of regeneration. After a period of six months or so, it has been found possible once more to restore the continuity of the bowel. The technique of this method of treatment has been perfected at the Hospital for Tropical Diseases and thereby many poor wretches, whose end was inevitably near, have been restored to health and utility. Until recent years the treatment of liver abscess was mainly operative, that is, it entailed a major operation. Although no claims to originality can be made, it may be said that the method of aspirating the pus from the diseased liver as elaborated at the Hospital in London has made a distinct advance in the treatment of this complaint. This simple method can be undertaken with safety and with little or no inconvenience to the patient, and when combined with the emetine treatment the results are apparently permanent and the death-rate negligible. Sprue is still one of the enigmas of tropical medicine. Although its exact cause is unknown, it may be stated that its treatment has been placed on a more satisfactory basis than before, and for this the calcium lactate and parathyroid treatment evolved by Dr. H. H. Scott at the Hospital for Tropical Diseases is partly responsible. This treatment is combined with a very careful dietary. By weighing the intake and output of the patient, the exact assimilation of any particular food can be assessed and it is thereby ascertainable when a patient can be fed on a milk or fruit or raw meat dietary or possibly on a combination of all three. Blood transfusion in cases of the very severe anæmia which accompanies sprue has been found to produce favourable and lasting results. It is safe to assert therefore that however far gone in sprue a patient may be, there is hope for recovery such as never existed before.

The above summary serves to indicate that in London no opportunity is missed or means neglected of treating tropical diseases and of profiting thereby, but it is desirable at this juncture, in order to avoid misunderstanding, to bring out a special point with regard to the activities of the Hospital for Tropical Diseases, Endsleigh Gardens, London. The work of this hospital, while it is admittedly an imperial necessity, is complementary to that carried out in institutions in the tropics and particularly to the activities of the Calcutta School of Tropical Medicine and Carmichael Hospital for Tropical Diseases. In London the command of more time and perhaps of more elaborate apparatus enables more exhaustive observations to be made and while the quantity of certain clinical material (for example, cases of kala-azar in Calcutta) is greater in centres abroad, the quality and variety of the cases in London is not to be met with elsewhere. So far as treatment is concerned moreover, there are many tropical maladies not amenable to treatment in a tropical climate and without the attention of a highly skilled nursing staff: among such diseases are numbered sprue, blackwater fever and the more severe forms of dysentery.

The second requisite suggested was the provision of clinical material for the instruction of students and it is at once clear that the only body into whose charge come an adequate number or variety of tropical cases is the Seamen's Hospital Society. In the first place seamen of all races and nations come from all quarters of the world into its establishments and secondly, to its branch at the Hospital for Tropical Diseases, being a voluntary hospital, all other tropical sufferers also migrate either in search of free treatment or else to occupy one of the private wards which are so valuable a feature of the institution. Students of the London School of Hygiene and Tropical Medicine are dependent—as Manson rigidly maintained students should be—for the proper pursuit of their studies upon the examination of patients in the public wards of the Hospital for Tropical Diseases.

The practical experience of the many men and women who have gone from India and other tropical lands for treatment at the Hospital in Endsleigh Gardens is the best evidence of the efficiency of this institution in matters of nursing and general maintenance. The nurses are trained at the Dreadnought Hospital, Greenwich or at the Albert Dock, two of the most successful training schools for nursing, and in addition receive special instruction in the care of tropical cases. Courses of lectures from the members of the medical staff have recently been started and these lectures, together with a certificate or medal for success in the examination which concludes them, are open to trained nurses other than those actually on the staff of the Hospital. Facilities are also afforded for experience in the wards to fully trained members of the Overseas Nursing Association and the Indian and Colonial Nursing Service. In this connection it is perhaps not sufficiently realised that the nurse in the tropics has often to perform many of the duties of the doctor. She may perforce have to inject potent drugs into a vein in order to save a patient's life. Were she not adequately prepared by a proper course of training to undertake this or similar grave duties in some isolated station remote from medical aid, a valuable life would be lost which otherwise might have been saved.

It has been pointed out that the Hospital for Tropical Diseases, Endsleigh Gardens, Euston, as part of the Seamen's Hospital Society, is largely dependent financially upon voluntary support. The aid of any who, after reading the above survey, may deem well of the activities of this Hospital and may be willing to make a contribution for its continuance and extension, will be received with gratitude on behalf of the Board of Management of the Seamen's Hospital Society by the Agents of the Chartered Bank of India, Australia and China in Rangoon, Calcutta, Madras, Bombay or Colombo.

Current Topics.

THE FAR EASTERN ASSOCIATION OF TROPICAL MEDICINE, SEVENTH CONGRESS.

THE Far Eastern Association of Tropical Medicine to-day shares with the League of Nations' Health Committee the most prominent position with regard to general medical and research work in Asia. The Association held its first Congress at Manila in 1910; its second at Hongkong in 1912; its third at Saigon in 1913. The Great War caused an interruption in the sequence of Congresses, but the fourth was held

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in Java in 1921; the fifth at Singapore in 1923; and the sixth at Tokyo in 1925. To-day the Association is representative of every country in the Far East, and its sixth Congress was attended by delegates from twenty-six Far Eastern countries and States, including the United States—in so far as her tropical possessions are concerned.

The Seventh Congress of the Association is to be held in Calcutta in December 1927. His Excellency the Viceroy has consented to be Patron, and funds have been voted by the Imperial Government of India. The Congress is to open in Calcutta on Monday, December 5th, 1927, and Major-General T. H. Symons, C.S.I., O.B.E., K.H.S., I.M.S., Director-General, Indian Medical Service, has been nominated as President. Official delegates are expected to the number of 90 to 100 from some 30 foreign countries and States; whilst official delegates from the Government of India, the Indian Provincial Governments, and Indian States will number some 120. In addition it is anticipated that some 150 to 200 non-official delegates (chiefly from non-official institutions, hospitals, etc.), from foreign countries will attend the Congress, and probably some 300 or more members of the Association from India and other countries.

The scientific session will occupy the week December 5th to 10th, 1927, in Calcutta. In addition to the ordinary and special daily sessions, there will be official garden parties, a conversazione by the Indian Museum and the Asiatic Society of Bengal, another by the Calcutta School of Tropical Medicine; a special international medical exhibition relating to tropical diseases; a commercial exhibition relating to drugs and products of medical interest in the Far East; and specially arranged tours of inspection of medical and other institutions and industries in Calcutta and its environs. The tour programme of the Congress throughout India will then be embarked upon, and will last until December 22nd.

The Association includes the medical, dental, and veterinary professions. It is obvious that India cannot hope to vie with Japan in the latter's lavish and brilliant hospitality extended to the Congress in 1925. On the other hand there are special and most cogent reasons why the medical profession in India should on this occasion exert itself to make its influence in tropical medicine, and in research work in tropical medicine especially felt. With regard to medical research work, India stands second to no other country in the world. It was in this country that the parasites of kala-azar, of surra, and—if we may credit a very early plate of D. D. Cunningham's, the original of which to-day hangs in the museum of the Calcutta School of Tropical Medicine—of oriental sore, were first discovered. It was in India that the modes of transmission of malaria, of plague, of guinea-worm infection,—and we may perhaps add, of kala-azar—were discovered. India has shown the world how to deal with epidemic plague, with epidemic cholera—even with malaria, although other nations have perhaps taken more advantage of the last discovery than has India herself. She has organised a system of medical services which, despite all its imperfections, is still the admiration and the model for other tropical countries.

It is, therefore, "up to" India on this great occasion to show what she can do. The Congress will meet in this country by special invitation of the Imperial Government of India. It is necessary to exert ourselves, both with regard to the scientific and to the social aspects of the Congress. We shall be called upon to show alike both our scientific and professional abilities, and our powers of hospitality.

Membership of the Association for the purposes of the Congress consists of two classes: (*a*) Full members, who alone have the right to present papers, either by themselves or by others; and for whom the subscription is Rs. 26-10 (or £2, at present rates of exchange). The *Proceedings* of the Congress are printed in full, and full members of the Association receive a printed copy of the *Proceedings*. (*b*) In addition to this, associate members, who may attend the meetings of the Congress, pay a subscription of Rs. 5. Applications for membership should be addressed to Lieut.-Col. J. Cunningham, Organising Secretary, Far Eastern Association of Tropical Medicine Congress, Pasteur Institute of India, Kasauli, Punjab—(Code address for telegrams "Pasteur, Kasauli, India"). Correspondence regarding exhibitions, accommodation, local (Calcutta) programme, etc., should be addressed to the Secretary for Calcutta, Lieut.-Col. A. D. Stewart, I.M.S., Calcutta School of Tropical Medicine, Central Avenue, Calcutta. All medical men in possession of a qualification registrable in the United Kingdom are eligible for full membership; and all other medical men wherever registered are eligible as associate members. Medical institutions may also become members, and have the power to nominate an individual as their representative.

* * * *

The above notes deal with the main organisation of the Congress. There may be many of our readers, however, who will desire to submit papers or exhibits in connection with the Congress. For their information we publish the following notes with reference to *Scientific Papers and Exhibits for the Congress.*

I. SCIENTIFIC PAPERS.

Scientific papers on the following subjects are invited by members of the Seventh Congress of the Far Eastern Association of Tropical Medicine:—

(*a*) Anatomy, physiology, biochemistry, and pharmacology.

(*b*) Pathology, bacteriology, serology, protozoology, parasitology, and medical zoology.

(*c*) Tropical Medicine and Surgery, including dermatology, gynæcology, ophthalmology, and pyschiatry.

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(*d*) Physio-therapeutics, including radiology.

(*e*) State Medicine and Hygiene, epidemiology, maternity and child welfare, school hygiene, medical statistics, quarantine, and marine hygiene.

(*f*) Dentistry.

(*g*) Veterinary Science.

Scientific Sections.—Papers when submitted will be grouped according to their subject matter. The number and scope of the papers received will determine the number of sections instituted for the Scientific Session of the Congress.

Official Languages.—The official languages of the Congress are English, French, and German. Papers and their abstracts can only be accepted if written in one of these three languages.

Length of Papers.—The attention of authors is invited to Chapter 8 of the Bye-laws of the Association, which states that:—

"No address or paper before the Association, excepting the annual address, *shall occupy more than* 20 *minutes in delivery*, and no member shall speak longer than 5 minutes, nor more than once on any subject, except by unanimous consent.

"All papers read before the Association shall become its property and shall be deposited with the Secretary when read."

Members in preparing their papers are particularly requested to conform with the rules laid down in the above Bye-law.

Abstracts of Papers.—Members intending to submit papers are requested to send in the title of their papers as soon as possible (*see* form below). This should be followed by a typewritten abstract, not exceeding 1,000 words, which should reach the General Organising Secretary not later than July 31, 1927. These abstracts will be printed and, if possible, circulated to members before the Congress meets. No abstracts received after this date can be printed or circulated. The complete paper should be forwarded at a later date but should reach the General Organising Secretary not later than October 10th, 1927.

Diagrams and Illustrations.—Simple diagrams, photographs, or line drawings greatly assist in the rapid demonstration of points upon which the author desires to lay special stress. These are best shown in the form of lantern slides. A magic lantern will be available in each Scientific Section for the use of members who have prepared lantern slides to illustrate their papers.

Space in the Exhibition Section will be placed at the disposal of members who wish to exhibit actual specimens, whether microscopic or macroscopic.

Members who wish to illustrate their papers either by lantern slides or by means of specimens in the Exhibition are requested to give notice of the fact when forwarding the abstracts of their papers (*see* below under Exhibition Section).

Reprints of Papers.—Thirty reprints of each paper accepted will be issued to the author free of charge by the Congress. In cases where there is more than one author, this number will be divided equally between them.

Members who want further copies are requested to state the number they require *over and above the* 30 *reprints supplied to them free*, at the time that they send in the abstracts of their papers. These extra reprints will be charged for at cost price. Early intimation of the number of extra reprints required is absolutely essential, as once the requisite number of copies has been struck off and the type distributed no further reprints can be obtained.

II. EXHIBITION.

An Exhibition Section, illustrating the various manifestations of tropical disease, is being prepared in connection with the Congress.

A limited amount of space will be available for members who desire to exhibit specimens connected with their papers or subjects which are likely to be of general interest.

Macroscopic or microscopic specimens, photographs, pictures, or diagrams will be accepted for display.

Exhibits should be arranged in proper sequence with explanatory notes for each exhibit. These notes should be prepared on stiff white cards of suitable size.

As the space available for the exhibition of individual exhibits is strictly limited, each exhibit should be prepared with a view to *occupying as little space as possible*. Extensive exhibits cannot be accepted or can only be accepted by special arrangement.

Members desirous of obtaining accommodation for private exhibits are requested to inform the General Organising Secretary as early as possible giving the nature of the exhibit, the number of specimens, macroscopic or microscopic pictures, etc., to be shown and the probable amount of space required.

While the management of the Congress will make every attempt to meet the wishes of members, they can give no guarantee that any particular exhibit will be accepted, or, if accepted, will be exhibited in its entirety.

FAR EASTERN ASSOCIATION OF TROPICAL MEDICINE.
SEVENTH CONGRESS.

STATEMENT TO BE FILED IN BY INTENDING CONTRIBUTORS.

Name of Contributor. .....

Professional Titles and Designation. .....

Title of paper. .....

Will paper be illustrated by Lantern Slides? .....

Will Contributor require space in the Exhibition for Demonstration of Specimens? If so, please give details. .....

Will the Contributor read his Paper himself, or is he desirous of having it read on his behalf? .....

Signed .....

THE INDIAN SCIENCE CONGRESS, 1928.

THE Fifteenth Annual Indian Science Congress will be held in Calcutta from January 2nd, 1928 to January 7th, 1928.

In connection with the Medical and Veterinary Section of this Congress a difficult position has arisen. The decision to hold the Congress for 1928 in Calcutta was taken in 1926, and this decision was taken independently of the decision to hold the Seventh Congress of the Far Eastern Association of Tropical Medicine in Calcutta in December 1927.

The present position therefore is that one cannot predict to what extent the two will overlap. It is obvious that the first duty of the medical profession in India is to the Congress of the Far Eastern Association of Tropical Medicine; it is at this Congress that India has to uphold her international status in the sphere of tropical medicine. Modern scientific medicine—whether medicine proper, dental science, or veterinary science—is of international rather than of national importance. And it is extremely likely that all

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the most important medical and veterinary research papers will be presented to the Congress of the Far Eastern Association of Tropical Medicine in December 1927, rather than to the Indian Science Congress in January 1928. Further, it is very unlikely that official and unofficial delegates who attend the former Congress in December, will again attend the Science Congress in January. If there is any "overflow" of papers, it seems likely that only those which are inferior will be presented to the Science Congress. In other words—as is most right and proper—the Congress of the Far Eastern Association of Tropical Medicine is likely to take the cream off the milk so far as the Medical and Veterinary Section of the Indian Science Congress, 1928, is concerned.

Under these circumstances there appear to be two possible alternatives:—

(*a*) To abandon the meeting of the Medical Section of the Indian Science Congress for 1928 altogether; the Veterinary Section for that year being incorporated with the Zoological Section.

(*b*) To ascertain the general consensus of opinion among the medical profession in this country with regard to the feasibility or otherwise of holding a meeting of the Medical and Veterinary Section of the Science Congress in January 1928, immediately after the international Congress of the Far Eastern Association of Tropical Medicine in December.

The latter course is obviously the one to be preferred. But it is obviously desirable to sound the general opinion of the medical profession in this country as to the best procedure.

Will those who (*a*) intend to *attend* meetings of the Medical and Veterinary Section of the Indian Science Congress in Calcutta in January 1928, kindly *immediately* inform Major R. Knowles, I.M.S., School of Tropical Medicine, Central Avenue, Calcutta (President of the Medical and Veterinary Section), of their intention to do so; and (*b*) those who intend to present papers to be read and discussed at the Medical and Veterinary Section of the Indian Science Congress, 1928, also inform Major Knowles, I.M.S., of their intention to do so? If sufficient information can be gathered well ahead as to the possibilities or otherwise of holding a successful meeting of the Medical and Veterinary Section of the Indian Science Congress in January 1928, immediately after the Congress of the Far Eastern Association of Tropical Medicine in December 1927, it will be possible to come to a decision. It is quite possible that the medical, dental, and veterinary professions in India can supply sufficient interesting material for both Congresses; but the decision as to whether this is the case or not, largely rests upon the response to this appeal.

Should a sufficiently encouraging response be obtained, and should it prove feasible to hold a meeting of the Medical and Veterinary Section of the Indian Science Congress in January 1928, it is hoped that next year will see a considerable revision of policy with regard to the admission of papers to be read. In place of allowing dozens of papers, many of which are of but little interest, and of interminable discussions on matters of but minor importance, it is hoped to exercise a much more rigid selection of papers admitted. Authors will not be asked to conform to a hard and fast rule that papers shall not exceed 15 minutes in reading; but by dint of rigid selection of papers and by organisation of discussions beforehand, it is hoped that more interesting and more profitable results may be obtained than previously.

Either the Medical and Veterinary Section of the Indian Science Congress, 1928, should be abandoned in view of the more important and international claims of the Far Eastern Association of Tropical Medicine Congress in December 1927; or it should be held, and should be made a success.

(The decision as to whether to hold a meeting of the Medical Section of the Indian Science Congress, 1928, of course in no way affects the holding of the general Congress, which will take place as usual. It is only a question as to whether it is feasible or advisable to hold a meeting of the Medical Section under the circumstances; and it is largely "up to" our readers to advise as to a decision. Should it be decided to hold a meeting of the Section, the rules with regard to it will be published later; but we would remind would-be contributors that summaries of their proposed papers must be to hand before October 15th, 1927).

Research Work on Plague.

IN *The Indian Medical Year*, 1926, published as a supplement in our issue for last month, it was mentioned that a report had been received from Lieut.-Col. F. P. Mackie, O.B.E., I.M.S., Director, Haffkine Institute, Bombay, on the research work carried out in connection with plague and the improvement of Haffkine's vaccine during 1926 at that Institute. The following is a summary of Colonel Mackie's report:—

Bactericidal Action on B. pestis.

(REV. FATHER J. F. CAIUS; B. P. B. NAIDU; S. JANG).

116 chemical compounds were tested *in vitro* for their bactericidal action on *B. pestis*.

The method adopted was the so-called "inhibitory method."

The substances studied so far fall within four groups:—(1) the common phenols; (2) derivatives of the common phenols; (3) the phthaleins; (4) derivatives of fluorescein.

The results arrived at with the phenols mainly corroborate the findings obtained by their action on organisms other than *B. pestis*. By far the most powerful bactericide is sodium quinolate which stops the growth of *B. pestis* within 15 minutes in a dilution of 1 in 308,000 (nearly a hundred times more potent than mercurochrome).

The most potent of the substituted phenols is 2:4—diamino-phenol, which acts within 15 minutes in a dilution of 1:9600 (three times more potent than mercurochrome).

Among the phthaleins the highest bactericidal action was obtained with diacetylphenolphthalein in a dilution of 1:2400.

Mercurochrome (—sodium 2:7=dibromo=4=hydroxymercurifluorescein) inhibits the growth of *B. pestis* within 15 minutes in a dilution of 1:3200. It may

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be said that as a class the phthalein dyestuffs have a relatively small bactericidal value, the eosins in particular being quite inert.

Taking mercurochrome as our standard of comparison since that substance is the only one which we have tried *in vivo*, we have the following results:—

Quinol	1:308000
Catechol	1: 24000
p-chloromercuriphenol ..	1: 16000
Carvacrol	1: 9600
2:4-diaminophenol	1: 9600
Toluhydroquinone	1: 4800
Diazoresorcin	1: 4800
m-cresol	1: 3600
Nitrosobetanaphthol	1: 3200
Mercurochrome	1: 3200

Summary of work carried out at the Bio-chemical Unit of the Haffkine Institute.

By MAJOR S. S. SOKHEY, I.M.S.,

M. A. MALANDKAR AND S. K. GOKHALE.

DURING the year the unit was engaged in investigations connected with Haffkine's prophylactic.

1. A new method for the measurement of growth of *B. pestis* in liquid medium.

Difficulties were encountered with the opacity method and the method of counting colonies. The new method consists in the measurement of the amount of CO_2 given out by the organism during growth. 1 c.c. of CO_2 produced was found to be equal to 0.41 $\pm$ 0.05 mg. of dry weight of organisms. This method is capable of precise measurement, and was used during subsequent work.

2. Reducing the alkalinity of the prophylactic by growing *B. pestis* in buffered medium.

It has been noted by Myer, Bannermann and Naidu that the alkalinity of the medium increases steadily during growth of this organism. The writer found that the hydrogen-ion concentration of the finished vaccine lay between 9 and 10. Wells has reported that the formation of alkali albuminates destroyed the antigenic capacity of albumins. Falk found that the hydrogen-ion concentration of protein suspensions had an influence on the immunological response, acid solutions being generally more effective.

To counteract the possibly injurious effect of the alkalinity on the immunising capacity of Haffkine's prophylactic, the organism was grown in laboratory broth buffered with phosphates. Several experiments were carried out and it was found possible to keep the reaction below pH. 7, but the growth was poor and the immunity not higher than that conferred by Haffkine's prophylactic.

It was surmised that the poor results might be due to the high salt concentration of the buffered laboratory broth—which was 1.5 per cent. Therefore fresh experiments were carried out with a liquid buffered medium of a salt concentration of 0.8 per cent. Peptone broth buffered with phosphates was used. Good growth has been obtained and the immunity has been found to be 16 per cent. to 100 per cent. higher than that with the corresponding Haffkine's prophylactic made from the same strains of organisms.

3. The effect of amino-acids on the growth of *B. pestis*.

To reduce the salt content and also possibly to enrich the medium, glycocoll was used to buffer laboratory broth. It was found that a 2.5 per cent. concentration of this amino-acid prevented the growth of the organism altogether, while 1 per cent.—the least we could profitably use for buffering—gave only a poor growth.

This suggested an enquiry into the presence or production of amino-acids in broth as a possible hindering factor. The amino-acid content of laboratory broth was found to be about 0 15 to 0.2 per cent. and did not rise above 0.5 per cent. during growth. This amount of amino-acid was not found to be an injurious factor.

4. Isolation of the antigenic factor from Haffkine's prophylactic.

Filtrates obtained by filtering unheated prophylactic through Pasteur-Chamberland filters were found to possess almost as high an immunising value as the original prophylactic—confirming previous work on the supernatant fluid. Original broth and this filtrate were subjected to chemical analysis, and it was found that an albumin was present in the filtrate which was not present in the original broth. So far it has not been possible to isolate this albumin in a pure and soluble form, but when precipitated with the proteoses present, and redissolved in a smaller volume of water in the only experiment done, it gave an immunity twice as high as the original filtrate. Work on these lines is proceeding.

5. Production of ammonia during the growth of *B. pestis* in liquid medium.

The intact stage of the protein molecule has antigenic properties, while cleavage products of protein are totally devoid of it. Ammonia production has been quantitatively studied as a possible indication of hydrolysis of the organism. It is interesting to note that in buffered media when the amount of ammonia produced rises high, the immunising value of the vaccine falls.

Summary of work carried out at the Haffkine Institute.

By B. P. B. NAIDU AND S. S. JUNG.

(*April* 1925—*November* 1926.)

1. EXPERIMENTS on the test virus for estimating the potency of the vaccines.

Results showed (1) that the spleen of a rat which has died of acute plague, or an agar culture made from its heart-blood could be used for the test virus; (2) that 1 c.c. of a 1,000th dilution of an agar culture of 48 hours' incubation and of opacity 3 of Brown's standard opacity tubes, could be used as a test dose for rats, instead of 0.003 milligram of plague-spleen; and (3) that in these doses, a mortality of 95 to 96 per cent. resulted in 15 days following the subcutaneous inoculation in rats, whereas the test dose of 0.003 milligram of plague-spleen which has hitherto been employed to estimate the potency of anti-plague vaccines, produced a mortality of 89.2 per cent., 87.8 per cent., 94 per cent., and 93 per cent., respectively, when employed in dilutions of 1 in 10, 1 in 1,000 and 1 in 10,000.

Further experiments are now in progress to determine the lowest dilution necessary to produce a uniform mortality of 90 to 100 per cent. in 15 days when inoculated subcutaneously into rats. Experiments are also in progress to determine the test dose for guinea-pigs and rabbits.

2. Experiments on the virulence of *B. pestis* with regard to the potency of the vaccines.

Results showed (1) that the prophylactic prepared from an old culture of low virulence, produced a mortality of 2 per cent. due to toxicity and conferred an immunity percentage of 18.4; (2) that repeated passages of this culture of low virulence, in rats resulted in a very virulent culture; and (3) that the prophylactic prepared from this culture, when its virulence was raised by passages in rats, produced a mortality of 12 per cent. due to toxicity and conferred an immunity percentage of 45.5 while the percentage immunity among the untreated controls was 10.

Experiments are in progress to determine the virulence of organisms employed for the manufacture of the vaccine, and to maintain the virulence of a culture in suitable culture media.

3. Experiments on the relation between "toxic deaths" in rats and the local and general reactions in man following the inoculation of the prophylactic and its constituents.

Results showed (1) that the supernatant fluid was slightly less toxic than the whole prophylactic, while the sediment and the nutrient broth employed in the preparation of the prophylactic were the least toxic when inoculated subcutaneously into rats in doses of 0.5 c.c.; and (2) that the degree of reaction following on the inoculation of the prophylactic and its constituents in man in doses of 4 c.c. showed that, apart from the individual susceptibility to inoculations, the "toxic

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deaths" in rats were a measure of the reactions induced in man by the inoculation of an anti-plague vaccine.

4. Experiments on the effect of variation of the incubation period on the prophylactic.

Results showed (1) that the potency of the prophylactic increases with the period of incubation, reaching its maximum between the fourth and the fifth week of incubation; (2) that this potency remains fairly constant until the end of 13 weeks; and (3) that the prophylactic gradually begins to diminish in its potency when incubated for 16 weeks and longer. Further, the toxicity also begins to diminish gradually after 12 weeks of incubation. Experiments with 4 different brews, incubated for periods varying from 85 days to 176 days, showed that as a result of the growth of plague bacilli, the medium gradually increases in its alkalinity during the first 5 to 7 weeks; this is followed by very slight fluctuations in the degrees of alkalinity throughout the period of incubation, extending to 176 days. At the end of this period, the organisms are viable and a good growth is obtained on agar when subcultured.

5. Experiments on the enrichment of the prophylactic.

To improve the quality of the prophylactic, Haffkine enriched the vaccine by the addition of fresh plague bacilli cultivated on agar. He hoped by this addition that he might further reduce the case incidence of the disease.

Results showed that when fresh agar growth was added to the supernatant fluid of the prophylactic, an improvement in the potency of the vaccine resulted by about 14 per cent.

Bannermann showed that the broth in which plague bacilli were grown for a period of 6 weeks was not exhausted of its nutriment, but that the resulting alkalinity did not support growth further. Experiments with the supernatant fluid of the prophylactic, neutralised and resown with fresh culture of plague bacilli, when incubated for a further period of 6 weeks, showed that the potency of the vaccine was not improved.

6. Experiments on the potency of vaccines grown in different media.

Experiments on the potency of vaccines grown in broth, trypsin-broth and casein-broth, when compared, showed that with casein-broth a higher degree of protection was obtained by about 17 per cent. than that obtained with ordinary broth. The addition of 0.5 per cent. of glucose to these liquid media resulted in a poor vaccine, the organism ceasing to grow in the glucose media within a few days of sowing.

We propose to continue this line of enquiry on other culture media, such as broth prepared by digestion with papain, etc.

7. Experiments on the potency of vaccines grown in buffered media.

Trypsin-broth, casein-broth and ordinary broth were buffered with acid phosphates, and after inoculation with plague culture were incubated for 6 weeks. Vaccines prepared from these were tested for potency, as compared with vaccines from unbuffered media.

Results showed (1) that the potency of vaccines prepared from buffered broths was not greater than that of vaccines prepared from unbuffered broth, at hydrogen-ion concentrations ranging from pH 6.0 to pH 7.2; (2) that the potency of vaccines prepared from buffered trypsin-broths was poorer than the potency of vaccines prepared from unbuffered broths, at hydrogen-ion concentrations of from pH 6.2 to pH 7.2; (3) that the potency of vaccines prepared from buffered casein broths was not greater than the potency of vaccines prepared from unbuffered casein broths at hydrogen-ion concentrations of from pH 6.4 to pH 7.2; and (4) that vaccines prepared from broth at an initial hydrogen-ion concentration of pH 6.8 gave a higher immunising value than at any other concentration.

As it is considered that the higher salt concentration in buffered media might have been responsible for their low potency, it is proposed to continue these experiments on suitably buffered media to determine if a more potent vaccine can thus be obtained.

8. Experiments on the potency of agar-grown vaccines sensitised with immune sera of horse, sheep and rabbit (published in the *Indian Journal of Medical Research*, October, 1926).

Results showed that vaccines sensitised by one or other of the immune sera have no advantage over the unsensitised vaccines, and that an agar-grown vaccine is at least as potent as the plague prophylactic.

9. Experiments with mercurochrome—220 soluble in the treatment of plague. (Published in the *Indian Journal of Medical Research*, October, 1926.)

Results showed that (1) mercurochrome was lethal to plague bacilli in a dilution of 1 in 3,200 after contact for 15 minutes; (2) when injected hypodermically in doses of 10 milligrams it was not lethal to rats; (3) it was not lethal to rabbits in doses up to 10 milligrammes per kilogramme weight when inoculated intravenously; and (4) in the treatment of plague, doses, whether single or repeated, totalling in all from 5 milligrammes to 73.5 milligrammes, had no influence on the duration or termination of plague in rabbits and rats.

10. Experiments with resorcinol and mercurated trypan-blue in the treatment of plague.

These experiments are still in progress.

11. Experiments carried out from July 1925 to December 1926.

(*a*) Experiments on autolysing the plague culture of 6 weeks' growth with alcoholic solution of caustic potash (20 0 per cent.) in an atmosphere of (1) carbon dioxide, (2) hydrogen. Results were negative.

(*b*) Experiments on the concentration of the prophylactic *in vacuo*. Results were negative.

12. Experiments in conjunction with Father Caius on the bactericidal properties of certain drugs. (January, 1926 to September, 1926). 118 drugs were studied.

13. Experiments on the potency of vaccines of Major Sokhey (January to November, 1926). Forty-five vaccines were tested on rats.

14. Routine laboratory work.

(*a*) Estimation of the potency of different brews of vaccine manufactured. (July, 1925 to November, 1926). Seventy-one brews were tested on rats.

(*b*) We were sent to study the effect of the bacteriophage in the treatment of plague with Professor Marras and Dr. Avari. (March to the end of May, 1926). A report of our study has been submitted to the Government.

(*c*) Examination of the sterility of the vaccines manufactured. (July to December, 1926).

(*d*) Testing the sugar reactions of cultures used for sowing flasks (August to December, 1926).

Reopening of the Wellcome Medical Research Bureau.

(*Lancet*, December 18th, 1926, p. 1285.)

THOSE of our readers who have an opportunity of visiting London will be interested to learn that the Wellcome Museum of Tropical Diseases has been reopened.

On December 8th, Mr. Neville Chamberlain, the Minister of Health, reopened the Wellcome Bureau of Scientific Research, which has been reconstructed and enlarged. The building is in Endsleigh Gardens, London, N.W., and offers excellent facilities both for research and instruction. Individual workers who wish to follow any particular line of investigation are given accommodation, and information is made available to the medical and allied professions by means of a specialised reference library and a comprehensive museum.

The Bureau was founded in 1913 by Mr. Henry Wellcome, and is affiliated to the other institutions in London which bear his name. It contains 12 research laboratories, where investigations may be made in all branches of pathology and parasitology, but especially in tropical medicine and hygiene. The Museum, which is arranged in 20 small halls, aims at a general survey of disease, and is open to all medical men and students, and also to laymen introduced by a registered medical

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practitioner. Teachers are invited to make full use of it for purposes of demonstration, and arrangements can be made for them to bring classes of students. Much of the success of the exhibition, as Dr. S. H. Daukes, the Director, points out, is due to the co-operation of medical men in various parts of the world, and it is hoped that their help will continue so that the Museum may become even more complete.

Owing to the unavoidable absence of Mr. Wellcome in America, the proceedings were opened by Dr. C. M. Wenyon, Director-in-Chief of the Bureau, who introduced Mr. Chamberlain. In formally declaring the Bureau and Museum reopened, Mr. Chamberlain referred to the extraordinary acceleration of medical progress in comparatively recent times. The reason of this acceleration, he said, could perhaps be found in the fact that knowledge was now so rapidly spread from one part of the world to another. In the old days a new discovery seldom reached much beyond the immediate environment in which it was made, but to day every advance was immediately registered and imparted to everyone who was interested throughout the world.

The method of instruction adopted was pictorial, and the drawings, paintings, photographs, models, and actual specimens must present a picture of a vividness and impressiveness which perhaps could not be excelled by any other method of demonstration. The collection was, he thought, unparallelled in any medical school—certainly in England, and probably in the world. It dealt not merely with the diseases of temperate climates, but also with those of the tropics, and exhibited their causes, symptoms, treatment, and prevention with a completeness which was altogether unexampled. If, indeed, the great advances in medicine and surgery were largely due to the spread of knowledge from the one to the many, then everybody must agree that Mr. Wellcome was a great public benefactor in making available this epitome of all that science had hitherto achieved in this domain.

The Tomb Treatment of Cholera.

By ALEXANDER CANNON, M.B., ch.B. Canton.
(*China Med. Journ.*, December, 1926, p. 1210.)

THIS paper deals with experiments and bacteriological work carried out in connexion with the treatment of cholera by the Essential Oil Mixture of Tomb, who recently introduced this in the Asansol Mining District of Bengal, India.

Dr. Tomb's treatment of cholera with the essential Oil Mixture, is well known to our readers but may be repeated.

℞:

Spts. aether	.. m xxx
Ol. caryoph	.. m v
Ol. cajup	.. m v
Ol. junip	.. m v
Acid sulph. aromat. ..	.. m xv

One drachm, in half an ounce of water, every half hour in cases of cholera. The average dose required is approximately 8 drachms. One drachm in half an ounce of water, daily, as a preventative. Tomb says: "This mixture should be given immediately, when practicable, but it is claimed that in 95 per cent. of cases recovery will be secured within a period of seven hours from the onset of symptoms. No special care need be paid to the subsequent dieting of the case. Vomiting, purging, and intestinal pains, appear to be immediately controlled by this mixture. As little supervision is requisite, the value of this method in mass treatment of natives is obvious."

Manson-Bahr and others state that the cholera vibrio may be found in the stools for as long as 44 days after the patient has commenced convalescence. Bacteriological examinations (as detailed previously) so far show that after treatment with Tomb's mixture, the vibrios apparently ceased to exist from a period of six to twelve hours after treatment had commenced, with one exception of a naval officer who was seen by the author for the first time in the algid stage, Tomb's mixture (only) was given half hourly in sips and within fourteen hours the patient began to feel quite himself again. The Surgeon Captain of the Hongkong Base reports in this case the presence of the vibrio in the stools up to the fifteenth day. Probably if this patient had had further treatment with Tomb's mixture this would have been cut down considerably, if not to the twelve-hour limit. Should it be found that with effective treatment the period of infection from the stools is cut down in every case, this is a matter of considerable importance, especially from a shipping point of view, as a ship need not be kept in quarantine for more than twelve hours, as every one on board (passengers and crew) could be treated as potential cholera cases and given a dose of the mixture every half hour.

One case of typhoid fever showing a positive Widal reaction treated with the Essential Oil Mixture showed negative results within twenty hours, with marked improvement in the patient.

The only cases of cholera which occurred were in those who had not taken the mixture once daily as a preventive. Most of the cases had marked choleraic symptoms when first seen, with typical "rice water" stools. On bacteriological examination the cholera vibrios were found to be present in large numbers, in every patient. Only one man died and he refused treatment until it was too late. All other cases recovered in from seven to twenty-four hours of commencing treatment. Those recovering in seven hours had commenced the treatment early (no other treatment being given). Those who took longer to recover had waited until their symptoms were so marked that treatment had to be strictly enforced, (anyone who has tasted this mixture can understand why).

Brief details are given of eight cases in which the mixture was used with remarkable results. Unfortunately the total number of cases is not stated.

Dr. Connor also had astounding results with this mixture in so-called "food poisoning," resulting in speedy recovery.

He believes the secret of the treatment lies in the carbolic acid contained in the oil of cloves which is present in the Tomb mixture and adds: "There is reason to believe that this treatment saved both Shameen and Canton from a severe epidemic of cholera."

Amœbic Liver Abscess.

By A. I. LUDLOW, M.D., F.A.C.S., Seoul, Chosen (Korea).
(*China Med. Journ.*, December, 1926, p. 1165.)

THIS paper is of special interest as showing how the teaching of Sir Leonard Rogers is gradually being followed: it is also full of valuable information apart from the question of treatment. A brief abstract follows:—

The present paper deals with 60 cases. It is of interest to note the large number of cases met with in Chosen (Korea). Infection with *Endamœba dysenteriæ* showed an incidence of 41 per cent. among Koreans examined in Seoul.

Age.—The following table shows the age and sex incidence of 160 cases:—

	Males	Females	Total	Percentage
0 to 10 years ..	3	0	3	1.9
11 to 20 years ..	5	2	7	4.4
21 to 30 years ..	47	6	53	33.1
31 to 40 years ..	58	6	64	40.0
41 to 50 years ..	22	3	25	15.6
51 to 60 years ..	6	1	7	4.4
61 to 70 years ..	1	0	1	0.6
TOTAL ..	142	18	160	
PERCENTAGE ..	88.8	11.2	..	100.

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Special inquiry shows that 49 out of 60 patients, gave a definite history of the use of Korean wine or other alcoholic drinks. This would seem to warrant more stress on the use of alcohol, as a predisposing cause of amœbic liver abscess.

Very few presented a high leucocytosis; 27,400 being the highest reported.

The white blood count ranged from 3,000 to 32,400 (this case however was complicated by an abscess of the arm). In the uncomplicated cases, the highest was 28,000. The average leucocyte count was 11,537. One patient from whom was obtained 2,350 c.c. of pus at the first aspiration, showed a leucocytosis of only 10,600.

The highest polymorphonuclear percentage was 80 and the lowest 62, an average of 71.5. Forty-six were within the range of 70 to 80. The large mononuclears averaged 6 per cent., the small mononuclears 18 per cent. and the eosinophiles 4.5 per cent.

While the symptoms presented were variable, yet almost every patient gave a history of diarrhœa, fever, chills or sweats at some time during the period of illness. Pain in the right hypochondrium, especially on pressure was also present.

Icterus was observed in only 10 patients.

There is a sign to which special attention is called. This sign is deep-seated pain in the region of the abscess elicited by a sudden thrust with the end of the finger. The most common point at which this appeared was the ninth interspace, about 2 inches from the right costal border. This sign has been almost constant. It was present in 57 out of the 60 cases. At times the onset of the disease is insidious and such patients may be devoid of special symptoms on entrance to the hospital. The pulse, temperature, and respirations may be very misleading. Dr. Ludlow has never seen an amœbic liver abscess develop in any Korean or foreigner who has been under the care of the staff of the institution. The duration of illness varied from 2 weeks to 40 weeks with an average of 13.5 weeks. Subcutaneous injections of emetine (0.06 gram.) were given daily for 2 to 4 days before operation and continued 4 days to a week after operation. The provisional diagnosis having been made, aspiration is carried out.

The site of election for puncture is the point of greatest tenderness and swelling. Often this is in the ninth interspace in the anterior axillary line. If there is no special point, Dr. Ludlow usually aspirates here first. In some cases there is a marked swelling below the right costal margin or in the epigastric region. If so, he first inserts the exploratory needle in the region indicated. The needle should not be inserted to a depth of more than three or, at the most, four inches. In the large abscesses pus is usually found at a less depth.

He evacuates all the pus possible at one aspiration. The aspiration is repeated when the patient shows signs of marked pain or swelling. The daily injections of emetine (0.06 gram.) are continued until the patient has received from 6 to 10 doses.

The mortality including 'follow up' records, was as follows:—

	No. Cases.	Deaths.	Mortality Per cent.	Tot. Mortality Per cent.
First Series (Open Oper.)	30	4	13·3	(Open Oper.) 11·1 (Aspiration) 2·3
Second Series ,, ,,	30	3	10·0	
Third Series ,, ,,	40	3	7·5	
Additional ,, ,,	17	3	18·0	
Aspiration ..	43	1	2·3	
Total ..	160	14	..	8·8

A history of previous diarrhœa or dysentery was obtained in 90 per cent. of the patients, but it is a significant fact that amœbic liver abscess may occur in patients who have never had diarrhœa or symptoms indicating infection with *E. dysenteriæ*.

Reviews.

THE ELEMENTS OF MEDICAL TREATMENT.—By Robert Hutchison, M.D., F.R.C.P. Bristol: John Wright & Sons, Ltd., 1926. Pp. vii plus 163. Price, 7s. 6d. net.

ROBERT HUTCHISON has a genius for teaching, and it is a pity that he did not previously "think it worth while" to publish his lectures on the elements of medical treatment. It is just such a simple little book as this that will do more to increase the efficiency of the medical man than all the ponderous tomes which issue in such profusion from the press. Many medical writers seem to be imbued with the aim of demonstrating their own erudition, Robert Hutchison on the other hand has the rare and happy faculty of putting first things first, and of selecting the material which is of the greatest value to the young student. This book should be placed in the hands of every medical student and he should be compelled to master it before he strays into the regions of speculation and surmise into which he will inevitably be led by the medical pundits. Few medical practitioners will fail to derive the greatest benefit by reading and digesting the facts and principles which are so clearly stated in this little volume.

The book has the inevitable drawback that it is not written for students in the tropics, hence such subjects as malaria and kala-azar and dysentery are hardly dealt with.

It would be a great boon to the Indian student if an edition were to be prepared with a short appendix dealing specially with Indian conditions, but in the meantime we heartily welcome the book as the best existing foundation for a knowledge of the rational treatment of disease. It will be surprising if there is not an immense demand for a book of such inestimable value.

We must warn our readers that they must not expect to find accounts of the latest fads and drugs, but as the large proprietary firms keep them fully supplied with information regarding these they have no cause for complaint.

RHEUMATISM: ITS MEANING AND ITS MENACE.—By Lewellys F. Barker, M.D., and Norman B. Cole, M.D. London: D. Appleton & Company, 1926. Pp. 165.

THIS little book tells the public what they ought to know on the subject of rheumatism. Perhaps it tells them rather more than is necessary. The book will also be of interest to the medical profession.

CATECHISM SERIES. TUBERCULOSIS.—By James Crocket, M.D., D.P.H., F.R.C.P.E. Edinburgh: E. & S. Livingstone. Pp. 80. Price, 1s. 6d. net.

THIS small book is admirably arranged for the benefit of anyone who wishes to acquire quickly a thorough knowledge of the most modern teaching regarding tuberculosis. It belongs to the excellent "Catechism Series" published by E. & S. Livingstone of Edinburgh. While there are some who look upon this form of booklet superciliously, those who are desirous that the main factors regarding this terrible disease should be thoroughly known by all members of the medical profession recognise the usefulness of the method of question and answer. One cannot open any page without being struck at once by the clearness with which complex facts are explained. Many of the questions are just those which a doctor would like to ask the expert and the answer follows in the shortest and most intelligible form. The booklet is written by Dr. James Crocket, himself not only an expert in the disease, but also an experienced teacher. It is to be heartily recommended to anyone who wishes to bring his knowledge of tuberculosis up-to-date or to have a handbook of reference by his side.

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MATERIA MEDICA AND THERAPEUTICS: AN INTRODUCTION TO THE RATIONAL TREATMENT OF DISEASE.—By J. Mitchell Bruce, C.V.O., M.A., L.L.D. (Hon.), M.D. (Lond.), F.R.C.P., and Professor Walter J. Dilling. Thirteenth Edition. London: Cassell & Co., Ltd., 1926. Pp. xv plus 686. Price, 10s. 6d. net.

THE great popularity of this book is evident from the fact that it has gone through 13 editions, and has been reprinted 18 times since it first appeared in 1884. The present edition has been thoroughly revised and many parts have been entirely rewritten. The book includes a description of the lately introduced remedies such as bismuth preparations, sanocrysin, mercurochrome, novosural, and new compounds of arsenic, such as tryparsamide. The pharmacological actions of the drugs concerned have been stated very clearly and lucidly.

We strongly recommend this book to students and practitioners alike.

COLLECTED PAPERS OF THE MAYO CLINIC AND THE MAYO FOUNDATION. Edited by Mrs. M. H. Mellish, H. Burton Logie, M.D., and Charlotte E. Eigen Mann, B.A. Volume XVII, 1925. Published May, 1926. London and Philadelphia: W. B. Saunders Company, Ltd. Pp. 1078, Illustrated. Price, Cloth, 60s. net.

THIS volume contains a series of very interesting papers of both medical and surgical interest. In the section on the alimentary tract there are important papers dealing with the pathology and treatment of gastric and duodenal ulcer, and with the diagnosis and treatment of pathological conditions of the liver and bile passages. The papers dealing with the action of ammonium chloride and novosural in the treatment of ascites caused by hepatic disease, and with the incidence and treatment of amœbiasis are of special interest.

The section on the urogenital organs has an important paper on intravenous chemotherapy in urinary diseases, which brings out the efficacy of mercurochrome in the treatment of infections of this tract. There are also important papers dealing with the surgery of the kidneys, ureter, bladder, and prostate.

In the section dealing with the ductless glands there is a very important paper on the functions of the thyroid gland, also a paper by Kendall on thyroxin, with special reference to its chemistry and attempts at its synthesis.

The section on the blood and circulatory diseases has many important articles, including those on the prognosis in heart disease, splenic syndromes, and a plethysmographic study of changes in the spleen volume.

The section on the chest has important articles on the experimental study of aspiration, and on tuberculosis of the pleura. The sections on the skin and syphilis, and central nervous system have contributions from very eminent authorities in these branches.

The book is well worth perusal and should form part of the library of every practitioner.

SURGICAL APPLIED ANATOMY.—By Sir Frederick Treves, Bart. Eighth Edition. Revised by C. C. Choyce, C.M.G., C.B.E., F.R.C.S. (Eng.). London: Cassell Company, Ltd., 1926. Illustrated with 162 figures including 66 in colour. Pp. x plus 726. Price, 14s. net.

IT is forty years since this medical classic was first written. It has now reached its 8th edition, and supplies a summary of a very extensive and indispensable subject; the summary is complete and accurate, yet the book is small and compact.

It is essentially a book for the senior student, but it will well repay the junior student to study it, and the practitioner who has it will find himself frequently referring to it.

In no other book of the same handy size can one find such a presentation of the facts and their applications. To the teacher in surgery also this small volume is of the greatest value.

SURGERY OF NEOPLASTIC DISEASES BY ELECTROTHERMIC METHODS.—By George A. Wyeth, M.D. New York: Paul B. Hober, Inc. Pp. 316, with 137 illustrations. Price, $7.50 net.

THIS volume does not profess to be a text-book. There is no attempt to state ultimate conclusions. Rather it is an attempt to explain with illustrative cases what diathermy is and how it is employed.

The early chapters deal with the history and production of high frequency currents. Then follow the main divisions of the subject: monopolar endothermy, bipolar endothermy, and the endotherm knife.

Monopolar endothermy must not be confused with fulguration or sparking. In monopolar endothermy there is contact between the electrode and the part treated, and the effect is desiccation of the cells without charring. It would appear to require special apparatus with delicate adjustment. This method is suitable for superficial lesions, including cancer.

Bipolar endothermy is the same as surgical diathermy. Its uses are well known and need no description here.

The endotherm knife is an application of bipolar diathermy. The electrode consists of a pointed needle or lancette, or of a knife blade of platinum or iridium.

According to the authors it is possible to cut the tissues by a thin line of coagulation which effectively sterilises as it proceeds. By capping the ends of the nerves this method produces all the effects of the anoci-association method of Crile.

A rapid method of hæmostasis introduced by Ward is described. The clamps left on the bleeding vessels are touched one by one with the active electrode. The current flowing down strikes and coagulates the vessel held in its jaws.

The remaining chapters deal with the applications of endothermy to lesions of the mucous membranes and the skin.

Surgeons and electrotherapeutists who are interested in the latest applications of the diathermy current are advised to read this book which will afford them considerable food for thought.

YOUR TONSILS AND ADENOIDS: WHAT THEY ARE AND HOW TO TAKE CARE OF THEM.—By Martin Ross, M.D. New York and London: D. Appleton and Company, 1926. Pp. 133.

"WHAT everybody ought to know about the tonsils and adenoids" would be a suitable title for this book. There seems to be an ever-increasing demand on the part of the public for more knowledge on the subject of their ailments. Books of this kind have to be written with great care, lest they become text-books of medicine. The author has succeeded in avoiding this error.

POPULAR EDUCATION IN PUBLIC HEALTH.—By W. Allen Daley, M.D., B.S., B.Sc. (Lond.), D.P.H. (Camb.), and H. Viney, S.R.N. London: H. K. Lewis & Co., Ltd., 1926. Pp. viii plus 210. Illustrations 2. Price, 6s. net.

THE Public Health Act of 1925 gave a decided impetus and encouragement to the propagation of knowledge of health and disease by official Public Health bodies in the United Kingdom. Prior to this, work in popular education in public health had been undertaken largely by voluntary bodies, such as the National Baby Week Council, the National Association for the Prevention of Tuberculosis and the British Social Hygiene Council. Similar work had been undertaken by some insurance companies, but most public authorities were shy of undertaking such publicity work, as it was doubtful whether they might legally expend public funds in this way. The Act cited above, however, allows public authorities to arrange for lectures, demonstrations, etc. and for such publicity work in connection with health and disease as they think necessary and desirable. The appearance of the present volume is therefore opportune. The authors have had wide experience both in general public health work and health publicity. They appreciate the fundamentals of real instruction in health, and realise the difficulties and shortcomings which may face

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those who undertake such duties, and also the general attitude of the great mass of the people with regard to health matters. The average man takes the "negative" view of health, that is to say, he regards health as the absence of definite disease. This indeed has been the view of the ordinary sanitarian until a short time ago. Nowadays however good health is something much more than this; it embraces not only the prevention of disease but covers every phase of the life of man, every influence, spiritual, intellectual and physical which reacts upon man's complicated person. To obtain and keep good health in this sense, a man needs knowledge of many matters and a high ideal of the good usages of life. It is this intimate connection with morality so to speak which constitutes one of the great difficulties of health work. Public work of this kind is being carried on mainly by Health Associations, Child Welfare Centres, the School Medical Service, within recent years by the National Insurance panel practitioners, and by Health Exhibitions organised by public bodies and voluntary associations. This book gives an outline of all these aspects of work, and is especially valuable in indicating the type of worker necessary, the methods which have been found successful in conducting health and welfare work, and the pitfalls to be avoided. To those whose work lies in these paths and for all interested the book will be of real value. Though primarily meant for the worker in the British Isles, there is much that could be applied or easily adapted to Indian conditions. This line of public health activity has definitely begun in India, and we recommend this book to those in any way connected with or interested in this aspect of public health progress.

OBSTETRICS.—By John S. Fairbairn, M.A., B.M., B.Ch. (Oxon.), F.R.C.P. (Lond.), F.R.C.S. (Eng.), Bombay: The Oxford University Press. Constable & Co., 1926. Pp. x plus 221. Price, 5s.

THIS is one of the new type of publications which are being issued to-day by the Oxford Press. It deals with fundamental principles and is a most excellent little monograph, written with that ease and grace which is always typical of Mr. Fairbairn's work. The parts which appeal most to the teacher are those that deal with the legislation affecting the growth of public interest in the Maternity service of Great Britain, and one can only wish that a time may yet arrive in India when it will begin to awake to the immense importance of the State taking an active rather than a dormant interest in those matters that pertain to obstetrics. This manual is one that any nurse or student who has to take a part in the life of the community may be well advised to purchase, and one feels sure that he or she will find it useful, for it can be stored in the inevitable black bag and will serve to pass the weary hours of waiting joyfully.

PRACTICAL NURSING FOR MALE NURSES IN THE R.A.M.C. AND OTHER FORCES.—By E. M. Hassard, A.M.S. (Retd.), and A. R. Hassard. Second Edition. London: John Bale Sons & Danielsson, Ltd., 1927. Pp. xvi plus 407. Price, 4s. 6d.

THE reviewer has read this book with great pleasure and interest, and considers it entitled to warm praise. It is a thoroughly helpful book and every orderly and male nurse would do well to keep a copy of it always by him. All the various points of nursing are thoroughly and clearly dealt with, and it is made sufficiently clear in all cases as to what is an orderly's work and what the doctor's, a point which is so often left vague. No nurse need be at any loss as to what to do or how to provide for any emergency that might arise, if he has this book to refer to.

SHORT NOTES AND MNEMONICS OF ANATOMY.—By A. S. Irving. Third Edition. Edinburgh: Messrs. E. & S. Livingstone, 1926. Pp. 123. Price, 1s. 3d. net.

THIS small book tabulates the branches of the arteries and nerves, with mnemonics to help students of anatomy in remembering them with ease. Short notes on popular questions and surgical spaces requiring frequent reference have been added with advantage. These mnemonics are certainly useful as adjuncts in helping memory when the parts have been studied in detail.

ULTRA-VIOLET RAYS IN GENERAL PRACTICE.—By W. Annandale Troup, M.C., M.B., Ch.B. London: H. K. Lewis & Co., Ltd., 1926. Illustration, 12. Pp. xii plus 59. Price, 4s. 6d. net.

THIS little volume sets forth in simple language all the essential facts about the ultra-violet rays and their use in general practice. There is no padding. After a brief historical survey, the author devotes a couple of chapters to the action of the light on living organisms and to general considerations. Then follow chapters on technique and therapeutic applications. Among the diseases mentioned which do not yield to other forms of treatment are alopecia, eczema, psoriasis, herpes zoster, whooping cough, neurasthenia, and ringworm.

In his preface the author expresses the hope that his efforts may stimulate others to utilise this beneficial form of treatment, and to the reviewer's mind there is little doubt that an agency such as this is of almost universal benefit, and should not be allowed to remain in the hands of a few specialists; more especially when the technique of application is so simple and the dangers almost non-existent.

AN INTRODUCTION TO EXPERIMENTAL EMBRYOLOGY.—By G. R. de Beer. Bombay: Oxford University Press, Constable Co., 1926. Pp. 148. With 51 text-figures. Price, 7s. 6d.

WITHIN the past two decades a great deal of very interesting and important work has been done in the field of experimental embryology, and a large part of it within the last decade. An account of this work cannot be found in any general treatise on embryology in existence; the individual researches are scattered through numerous journals in a number of different languages, and all or even a large part of them would not be accessible to many readers. Even if they were, it would be a prodigious task for anyone but a specialist in the subject to find them and piece them together in such a way as to see their relations and significance. This is the work that the author of this book has done. He has gone through the voluminous literature and selected a total of 180 pieces of work by various experimenters, capable of being arranged in logical order, from fertilization to the assumption of the adult form. In the author's words it is a skeleton upon which further knowledge may be built. After an introductory chapter on the nature, and value of the experimental method, there follows a series of 23 short concise chapters, averaging only five pages each in length in which are described the important experiments, and conclusions that can be drawn from them, dealing with each step and phase in the development of an embryo. A knowledge of a certain minimum of the facts of straightforward comparative embryology is assumed, for, as the author points out, the experimental cannot precede the comparative aspect of embryology.

At the end of the work there is a list of the experiments dealt with, arranged by number, with the names of the experimenters and the references to the literature.

No individual who is interested in the biological aspects of medicine, or in pure biology, would fail to be both enlightened and entertained by this delightful little book. When he has read it, a little at a time, as the reviewer did, he will inevitably feel grateful to the author for unlocking for his inspection such a wealth of interesting and significant facts. It will make him feel much closer to the fundamental secrets of Nature than he was before, and will help him to understand and appreciate further work along the same lines when it comes to his notice. Anyone with any knowledge of embryology can read it easily and understandingly, and

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The Lancet, April 9th, 1921.

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anyone but a specialist in the subject will feel that into a little explored region of haze and darkness there has been cast a great and revealing light.

A. C. C.

MONOGRAPHS OF THE AMERICAN SOCIETY OF MAMMALOGISTS. NO. 1. ANATOMY OF THE WOOD RAT: COMPARATIVE ANATOMY OF THE SUBGENERA OF THE AMERICAN WOOD RAT (GENUS *NEOTOMA*).—By A. Brazier Howell. London: Baillière, Tindall & Cox, 1926. Figures in the text 37. Plates, 3. Pp. x plus 225. Price, 22s. 6d. net.

THE author states that the internal anatomy of all but a few mammals has been woefully neglected. Anatomists have heretofore shown a strong propensity to seek out material representing the rarer and more spectacular mammals and to neglect species of a more generalized nature available in abundance. The book is well produced, but its chief appeal will be to zoologists.

TUBERCULOSIS OF THE LUNGS: A PRACTICAL GUIDE FOR GENERAL PRACTITIONERS.—By H. H. Thomson, M.D., D.P.H., and A. P. Ford, M.R.C.S., L.R.C.P., D.P.H. London: Baillière, Tindall & Cox, 1927. Figures in the text 30. Pp. x plus 179. Price, 10s. 6d. net.

THIS book, which claims to be a practical guide for general practitioners, is admirably suited for this purpose. It gives just the information which the private practitioner requires. The book begins with an interesting historical survey, followed by a chapter on administration and another on prevention. The fourth chapter is an exceedingly practical one and correlates the morbid anatomy and physical signs, and the book thereafter deals with the clinical features. In the seventh chapter the great importance of early diagnosis is emphasised and the responsibility of the general practitioner is made clear:—

"The general practitioner occupies a most important position in relation to the early diagnosis of tuberculosis of the lungs. He is frequently called in to see the patient at the onset of the disease, when there are present certain disturbing symptoms which are causing anxiety, such as cough, wasting, hæmoptysis or pleurisy. He is thus in a position to detect the presence of the disease when it is most likely to respond to suitable treatment."

"In view of the prevalence of pulmonary tuberculosis, it is necessary that the general practitioner should always be on the *qui vive* for its presence, and he should make it a practice in any obscure case of illness or ill-health to ask himself the question, 'Is this patient suffering from tuberculosis?'"

The diagnosis and differential diagnosis are exceedingly lucidly and well arranged, while the unnecessary padding often found in such books is conspicuous by its absence.

The chapter on pulmonary tuberculosis in children is particularly useful and shows up the importance of the bovine type in such cases.

The domiciliary treatment is dealt with in a short, terse chapter. Artificial pneumothorax, its indications and the method of carrying out this operation, are very clearly described, and the indications for thoracoplasty are explained. After-care, prognosis and nursing occupy the last three chapters and an appendix is given in which are some useful prescriptions.

The book is a highly practical one. It is written by two men of very wide experience and should be in the hands of all general practitioners.

BARRIER CHARTS FOR HEALTH OFFICERS: A SYNOPSIS OF PREVENTIVE MEASURES AGAINST COMMUNICABLE DISEASE IN FOUR TABLES.—By S. H. Daukes, O.B.E., M.B., D.P.H., D.T.M. & H. Second Edition. London: Baillière, Tindall & Cox. Four charts. Price, 2s. 6d. net.

THIS is a new and improved edition of Dr. Daukes, *Barrier Charts*. These show in a graphic manner the barriers which can be interposed for the prevention of the spread of various diseases. These charts are of value to the student who wishes to obtain clear ideas on the subject of disease prevention, also to the public health worker who can refresh his memory of the steps to be taken in administrative control of each disease. The *Barrier Charts* will find their place in the office of every public health administrator. They are not yet complete, because our knowledge of disease prevention is not complete, but they summarise existing knowledge in a novel and interesting manner.

CLINICAL PEDIATRICS.—By John Lovett Morse, A.M., M.D. London and Philadelphia: W. B. Saunders Company, Ltd., 1926. Pp. 848. Illustrated. Price, Cloth, 42s. net.

DR. MORSE is candid. Instead of telling of his lofty ideals he confesses that he has written this book for his own amusement. Most books are written for the writer's amusement, but the admission is rarely made. Dr. Morse writes for the practising physician rather than for the student. He does not deal with diseases which he has not seen, so that we do not expect to get much help in connection with the special diseases of the tropics. A very valuable book, but more useful for American and European physicians than for us in India.

PRINCIPLES AND PRACTICE OF CHEMOTHERAPY: WITH SPECIAL REFERENCE TO THE SPECIFIC AND GENERAL TREATMENT OF SYPHILIS.—By John A. Kolmer, M.D., Dr. P.H., D.Sc. (Hon.). London and Philadelphia: W. B. Saunders Company, Ltd., 1926. Pp. 1,106. Illustrated. Price, Cloth, 55s. net.

THE chemotherapy and general treatment of syphilis is here dealt with in considerable detail, because of the great practical importance of the subject, and because the greatest advance in this new field of therapeutic science has been made in the treatment of syphilis.

It is true that most advance has been made in the treatment of syphilis, relapsing fever, frambœsia tropica and other spirochætal infections, in trypanosomiasis, leishmaniasis, schistosomiasis, piroplasmosis, malaria, amœbic and other protozoal and metazoal infections but some real progress, with practical applications, has also been made in the great and important field of bacterial diseases, and especially when chemotherapy is employed for the treatment of local as well as of systemic infections.

Chemotherapy commands a large share of attention and effort in medical research to-day, and this volume is of service to both the investigator and the practising physician.

It is a most valuable contribution to medical literature. The author is well known as one of the greatest living authorities on chemotherapy and his literary style is also excellent.

PERNICIOUS ANÆMIA, LEUCÆMIA AND APLASTIC ANÆMIA.—By J. P. McGowan, M.A., M.D., B.Sc. London: H. K. Lewis & Co., 1926. Pp. vii plus 116, with 12 illustrations including 2 coloured. Price, 7s. 6d. net.

THE results of investigation into the condition of leucosis of fowls and its resemblance to pernicious anæmia and leucæmia in human beings is discussed in this book. In fact, this recognition of the possible analogous pathogenesis between the fowl disease and human diseases led to this investigation. It was thought that an easy solution of the problems in the human disease might be found while investigating the disease in a less highly evolved animal. From this consideration and from the actual pathological process observed in the marrow in human cases the conclusion is arrived at that the disease is essentially an irritative condition leading through a stage of modified hyperplasia, to a condition finally of sclerosis or aplasia in some cases. The hæmolysis present in these diseases is attributable, not so much to the fragility of the cells, as to an attempt on the part of the reticulo-endothelial system

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to rid the organism of cells not suited to its circulation. The hæmolysis is a consequence of the disease and not, the cause of it. The embryology of blood formation is discussed and the process is regarded as essentially an intravascular one, the division of the cell from the stem cell being an amitotic one. The nature of aplastic anæmia, due to lack of iron and to toxic substances is discussed, and a state of sympathetic activity between the liver and the bone-marrow is suggested. The author is to be congratulated on publishing in this small volume a full discussion of the complex problems of the diseases concerned.

Annual Reports.

ANNUAL REPORT ON THE PUBLIC HEALTH ADMINISTRATION OF BURMA FOR THE YEAR 1925. BY LIEUT.-COLONEL E. BISSET, I.M.S., DIRECTOR OF PUBLIC HEALTH, BURMA. RANGOON: SUPERINTENDENT, GOVT. PRINTING AND STATIONERY, BURMA, 1926. PRICE, Rs. 2.

THE total area and population under registration remained the same as in 1924. Immigrants entering by the 6 ports of Burma totalled 372,733 and emigrants 350,974—a net addition to the population of 21,759. There were 15,472 fewer immigrants and 35,141 more emigrants than in 1924. The observatories at Prome, Henzada, Thatôn, Victoria Point, Kanpetlet, Tiddim and Taunggyi have been abolished. The remaining 17 returned a total mean rainfall of 106 inches as against 112 for the same stations last year. The price of rice in all districts was less than last year and this year cheaper rice is accompanied by a lower provincial death-rate but there is certainly no connection between the two facts.

District Health Officers and Vaccination Staff inspected 9,774 out of the 35,075 villages where registration of births and deaths is enforced, and 313,127 entries were verified resulting in the detection of 1,692 omissions. District staff verified 81,886 entries in 5,833 villages and detected 329 omissions.

There were 1,609 prosecutions of parents or guardians for neglecting to report births and deaths and 1,490 of these were punished by fines ranging from four annas to Rs. 15: 44 were warned and the cases of the remaining 75 had not been disposed of at the close of the year.

Birth and Death Rates in the Several Provinces of India.—The birth and death-rates of Burma for 1925 are lower than those of any of the other provinces, while the infantile mortality figure (188.99) is the second highest, being exceeded only by the Central Provinces (204.44). The North-West Frontier and Assam also return low birth and death-rates. The highest birth-rate (43.90) is recorded by the Central Provinces, followed by the Punjab (40.1) and Bihar and Orissa (35.63). The highest death-rate is recorded by the Punjab (30 0) followed by the Central Provinces (27.27). Bihar and Orissa has the lowest infantile mortality figure (137.66) followed by the North-West Frontier Provinces with 139.13.

Births.—The total number of births registered during the year was 274,644 of which 141,302 were males and 133,342 females. The proportion of males born to every 100 females was 106 as in last year.

The birth-rate of the Province is 25.38 against 27.40 in 1924 and 29.98 the quinquennial mean. The natural increase of the population by excess of births over deaths was 7 per mille against 6 in the previous year. The birth-rate in rural areas is 25.14 as against 27.44 last year.

The steady fall in births observed since 1921 continued during the year and there is little doubt that the abolition of the beat patrol system of collecting counterfoils is the main reason. The birth and death-rates of the Province during the year are the lowest on record.

The Finance Committee rejected a proposal made by Commissioners of Divisions in conference in April 1925 to remunerate headmen for recording vital statistics at the rate of annas 4 per entry with a view to stimulating interest in the matter. The remuneration would have worked out at an average rate of Rs. 12-12-0 per annum for each headman.

It is reported that in Thatôn District many headmen were not in possession of registers throughout most of the year. It is therefore not surprising that this district returns the lowest provincial birth and death-rates. The following figures from Toungoo District illustrate vagaries which can only be due to defective registration and defective collection of birth certificate counterfoils:—

	1925.	1924.	1923.
Myoma Police Station Circle ..	557	1,218	1,059
Kanyutkwin Police Station Circle	397	1,019	840
Kyaukkyi Police Station Circle	235	722	457
Mon Police Station Circle ..	252	444	309

The District Health Officer, Toungoo, however, reports that no comment has ever been made by Township Officers with regard to the irregular submission and correctness or otherwise of the returns. This is significant of the amount of interest taken in the matter by these officials.

The District Health Officer, Kyaukse, while scrutinizing the vital statistics returns for October, November and December 1925 noticed that no counterfoils had been received for this period from 10 villages with a total population of 4,000 persons. In almost every instance of a low birth-rate the chief cause according to District Health Officers has been the non-receipt of counterfoils or their receipt too late for inclusion in the contemporary returns. In Mergui District the increase of births over last year is attributed to the improvement of registration as a result of the Deputy Commissioner issuing orders to the Township Officers and Subdivisional Officers to pay more attention to registration of vital statistics in the course of their tours. The largest excess of births over deaths for the Province during the year (17 per mille) and the lowest infantile mortality figure (114.43) are furnished by Tavoy District. The District Health Officer attributes this excellent record to a definite improvement in registration combined with a fortunate absence of any severe epidemic.

Deaths.—A total of 202,933 deaths as against 233,166 in 1924 was registered for the Province. Of these, 160,982 occurred in rural areas and 41,951 in towns.

The provincial death-rate for the year is 18.75, against 21.54 in 1924 and the previous five years' quinquennial mean of 22.43. The rural death-rate is 16.77, and the urban death-rate 34.22.

Deaths among men were, as in previous years, in excess of those among women. The number of the former per 100 of the latter was 112, as in 1923 and 1924. In Minbu and Shwebo districts, the ratio was cent. per cent. while in Lower Chindwin, Pakôkku, Sagaing and Myingyan deaths among men were fewer than among women which circumstance is explained by the preponderance of the number of women over men in these districts. Deaths from all causes except small-pox and injuries, were less than last year.

Infant Mortality.—There were 51,906 deaths among infants under one year of age, yielding a ratio of 188.99 per 1,000 registered births against 197.86 in 1924 184.09 in 1923. Of the total deaths of infants, 15,118 were in their first month of life, 25,998 were between one and six months, while the remainder 10,970 were between seven and twelve months of age. Nearly 29 per cent. of the infants died in the first month of which 49 per cent. died in the first week, 50 per cent. in the following five months and 21 per cent., during the second six months. Thus approximately 80 per cent. of the infant deaths occurred in the first six months of life.

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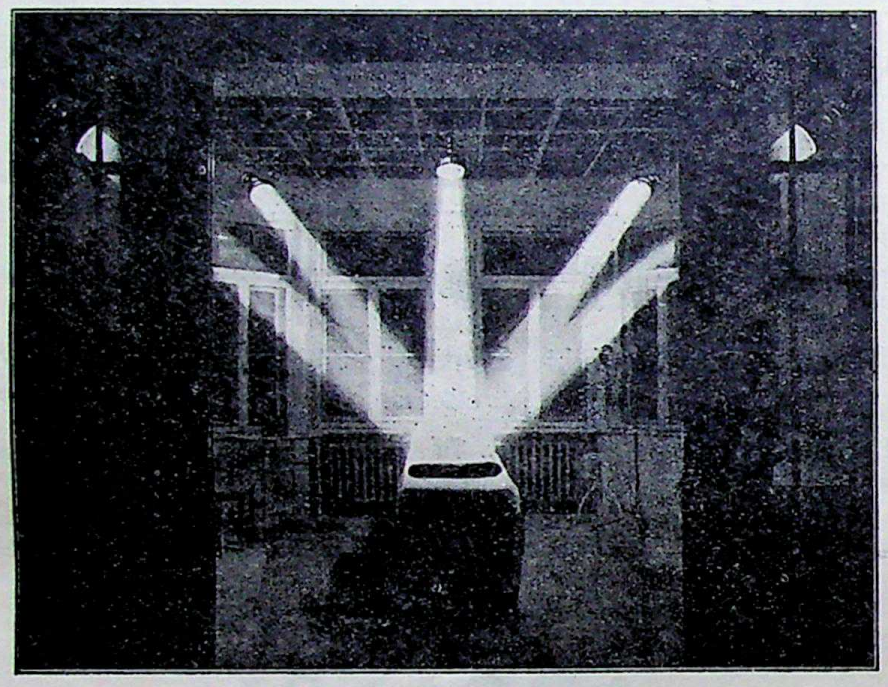

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Infant Welfare Societies.—The administration of the Child Welfare Endowment Fund remained in the hands of the Burma Branch of the Indian Red Cross Society which contributed Rs. 500 to the Society for the Promotion of Infant Welfare, Moulmein, and supplied Red Cross articles to the value of Rs. 578-13-5 to the Maternity Shelter, Prome. The Societies at Rangoon and Moulmein received the usual Government grants.

Successful Baby Weeks were again celebrated in Rangoon, Mandalay, Moulmein, Sandoway and Bassein. They were also held for the first time in eleven other centres.

HISTORY OF THE CHIEF DISEASES.

Cholera.—There is a satisfactory decline in the provincial death ratio for cholera. It was 0.75 in 1924 and this year is 0.18. The actual number of deaths was 1,932 against 8,083 in 1924. Of these 236 occurred in towns and 1,696 in rural areas. Akyab, Kyaukpyu and Ma-ubin Districts return rates above the quinquennial mean and more than half the deaths in the Province occurred in the former two districts. During January there were 206 deaths in the Province but the mortality decreased to 80 in March, only to rise again in April to 224, reaching a maximum for the year in May during which month there were 292 deaths. After May the mortality gradually decreased until October when only 24 deaths were registered. In December, there was a severe recrudescence resulting in 200 deaths of which 197 occurred in the rural areas of Akyab District. During the whole of 1924, only 7 deaths from cholera were recorded in Akyab District although that year was a particularly bad cholera year in the rest of the Province. This year however there were two distinct outbreaks. The district was infected late in 1924 and the monthly mortality gradually increased until June when 102 deaths were recorded. Thereafter the severity of the epidemic waned until December, when, unfortunately, a severe recrudescence took place resulting in 197 deaths during that month. The first epidemic appears to have been imported by immigrants from Chittagong where cholera was very prevalent. The second was probably the continuation of the first but fuel was undoubtedly added to the fire by a gang of Chittagonian labourers who returned to Chittagong in order to get firewood and brought infection back with them. The Sandawshin Pagoda Festival, which takes place in December and attracts pilgrims from a wide area, probably acted as a centre of dissemination of the infection. Considering the severity and the widespread nature of the epidemic in rural areas, Akyab town was fortunate in escaping with 53 cases and 36 deaths all of which occurred in the first half of the year. The infection was introduced by a labourer from Maungdaw circle where over a third of the total deaths of the district had occurred.

As is to be expected, in view of the comparative mildness of the cholera epidemic during the year, a very much smaller number of persons underwent inoculation than in 1924. Only 13,965 persons were protected as compared with 38,368 in the previous year.

Small-pox.—The death ratio for the Province is 0.36 as against the previous five years' mean of 0.20. The total deaths were 3,852 as compared with 2,501 in 1924. Over one-third of the deaths occurred in towns. Small-pox in endemic form persisted in Insein, Thatôn, Myingyan, and Sagaing Districts throughout the year. Deaths were recorded in Pegu District in every month except October.

The disease was very prevalent in Paungbyin and Mingin Township of Upper Chindwin District and caused 244 deaths. A great many cases were concealed and so escaped isolation, thus spreading the infection. Several headmen were dismissed for complicity. There was also a severe outbreak in Lower Chindwin District during the hot months, when 661 cases were reported of which 126 died. Over 70 of these cases were imported from Upper Chindwin. Mônywa town was also infected and there were 19 deaths.

In Rangoon 630 deaths occurred, by far the largest number in any one year since the severe epidemic of 1919. The town will remain liable to such epidemics until re-vaccination is made compulsory. Small-pox is endemic in the Province, but there is little doubt that Rangoon is generally infected by immigrant labourers. Support is afforded to this statement by the fact that the first cases in an epidemic usually occur among Hindus in October, November and December while Burman residents are not attacked until the epidemic is at its height in February or March. In the case of plague which is endemic in Rangoon itself all classes of the community are affected more or less simultaneously. Proposals are now before Government for the amendment of existing legislation to give the Port Medical Officer authority to re-vaccinate immigrants who cannot prove that they have recently undergone the operation. Of the 630 deaths that occurred in the town, 297 occurred among the unvaccinated, 209 amongst those who were said to have been vaccinated in infancy but on whom no scars were visible, while 124 occurred among those who showed vaccination scars but had not been vaccinated for a long time.

Out of the total deaths from small-pox in the province, two-thirds were among persons over 10 years of age. Primary vaccination is now compulsory over the whole of Lower Burma except in Sandoway, Kyaukpyu, Salween, and the Arakan Hill Tracts and is also compulsory in four districts of Upper Burma, but until re-vaccination is also made compulsory it will be impossible to stop the frequent recurrence of epidemics of small-pox. Proposals are now before Government for the introduction of legislation to empower local bodies who wish to do so to make rules for the compulsory re-vaccination of children in the areas under their control at 10 years of age.

One thousand six hundred and thirty-eight small-pox cases were treated in Contagious Diseases Hospitals and Isolation Wards. Of this number, 1,448 were in the Rangoon Corporation Contagious Hospital, and the remainder in hospitals in 23 other districts. Out of this number 987 had marks of vaccination but only 26 marks of re-vaccination. Twenty-one showed no marks though it was claimed that vaccination had been successful and 599 were un-vaccinated. Small-pox cases are for the most part isolated in separate wards of the local Contagious Diseases Hospital or in the isolation wards of the Civil Hospital. In certain places in the districts, temporary isolation huts are erected outside the inhabited area to accommodate such cases.

Plague.—There were 1,427 fewer deaths from plague in the Province this year than last. Rather more than half the deaths occurred in towns. The fall in the figures for the year is due to Mandalay town having escaped the severe epidemic which under ordinary circumstances was to be expected during the cold season of 1925-26. Unfortunately, there was a very heavy mortality during the year in some of the districts of Lower Burma so that the Province as a whole has not benefited to the extent it should have from Mandalay's escape. As a rule, the provincial plague mortality curve is at its highest during January, February and March, falls rapidly in May, only to rise again in June and July, after which months it declines to October, when the cold weather rise usually commences. This year the curve has departed somewhat from the normal, and the hot weather rise was at its maximum in August, while the mortality during December was also disproportionately high. The unusually high hot weather wave was due to a severe epidemic in Prome and Tharrawaddy towns.

Practically half the deaths in Yamèthin District occurred in Pyawbwè Town. Owing to the apathy shown by the Town Committee in dealing with the situation, the Deputy Commissioner found it necessary to exercise his authority under the Plague Rules and order the organisation of a disinfecting gang which was placed under the direction of the local Sub-Assistant Surgeon. Similarly in Mandalay town, although there was every reason to expect an unusually

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severe outbreak of plague in the town, the Municipal Committee refused to sanction the staff considered necessary by the Health Officer for thoroughly cleaning the town and the Deputy Commissioner had to step in and exercise his authority.

The total number of rats destroyed was 641,283 as compared with 687,703 in 1924. Rangoon Corporation accounted for 604,250. No rat destruction was carried out in Mandalay Town and save for a small number in Pyapôn District rat destruction was not systematically carried out in rural areas. The total inoculations performed in the Province were 82,239 as against 71,440 last year. Roughly two-thirds of the above number were done in towns. The people of Taunggyi who were previously unwilling to adopt the measure came forward freely this year and 2,160 persons were inoculated out of a total population of 6,016. It is gratifying to learn from the reports of District Health Officers that in many towns and villages leading men are using their influence to persuade the people to undergo inoculation.

Fevers.—When a registrar of deaths, who, in the rural areas of this province, is always the village headman, has satisfied his conscience that a death reported to him need not be recorded under the heads plague, cholera, small-pox or dysentery and knows that it is not the result of an accident or murder, he is left with the two classifications "All other causes" and "Fever." It is therefore natural that the largest number of deaths is reported under the former while the latter comes a good second. This year ratios under both heads are lower than usual but the ratio for "fever" has been declining steadily for several years while the ratio for "All other causes" has been more or less constant. The total of deaths attributed to fever during the year is 68,685. Of these 64,016 occurred in rural areas and 4,669 in towns. The mortality from fever was highest in January and December.

Deaths from fever in towns numbered 4,669 or 656 fewer than last year. Of these practically half (2,320) were due to malaria, 281 to enteric fever, 131 to measles, 97 to influenza, 36 to cerebrospinal meningitis, one to typhus and the rest to other fevers. Deaths from malaria are higher than those recorded in 1924 and 1923, but the number of deaths under "Total Fevers" has been declining since 1919.

The manufacture and sale of cinchona febrifuge tablets were transferred to the Prison Department with effect from the 1st April. The cost of free issues distributed under the orders of the Deputy Commissioner is debited to this Department.

As in the previous year, four-grain cinchona febrifuge tablets were manufactured. The total number turned out was 1,472,363 while the stock in hand at the opening of the year was 1,169,937 tablets. Treasuries absorbed 2,392,400 tablets and sold during the year 3,622,700, a decrease of 1,34,550 on last year, or practically only two-thirds of that year's issues. Just half the number of treasuries shared in the decrease.

Dysentery and Diarrhœa.—These complaints accounted for 6,801 deaths as against 8,585 in 1924. Of the total, 2,898 occurred in urban and 3,903 in rural areas. In towns, dysentery caused 1,520 deaths and diarrhœa 1,378 deaths. The decreased mortality from cholera this year is reflected in the reduction under this head as compared with last year because during epidemics of cholera many cases are registered as dysentery or diarrhœa.

Respiratory Diseases.—These diseases caused 10,580 deaths or 0.98 per mille, equivalent to a decrease of 0.05 on last year's ratio and 0.11 on the quinquennial average. Mandalay district as usual returns the highest provincial ratio but a slightly lower one than last year. The ratio for this district is to a large extent influenced by the high mortality from respiratory diseases in Mandalay town. The rise in mortality from these complaints in Kyauksè District from 0.18 in 1924 and the five years' average of 0.19 to 1.06 is explained by the Civil Surgeon as being due to the prevalence of a certain amount of influenza throughout the year, but no deaths from influenza were actually registered.

Beriberi.—During the year a preliminary investigation on beriberi in the Province was commenced by the Director, Pasteur Institute of Burma, with funds placed at his disposal by the Indian Research Fund Association. The lines of work during the year consisted of:—

(*a*) Investigation of existing records in the form of reports and statistics in relation to the distribution and the numbers of cases occurring.

(*b*) Examination of population figures as to the distribution of races and classes and their relation to the facts brought out by (*a*).

(*c*) Investigation into the average dietaries of each class of the population in the towns and villages in the more populous areas of Burma.

(*d*) Observations on milling of rice, qualities of rice produced, and the type used by each class in different areas.

(*e*) Enquiry into special outbreaks of beriberi during the year.

This work has been of great use in showing the special circumstances under which beriberi occurs and has cleared the ground for further work and shown the lines on which further investigations can best be directed.

Ankylostomiasis.—An examination for Ankylostoma infection was conducted on 17,297 prisoners (convicts and undertrials) in 13 jails during the year as against 17,633 prisoners in 16 jails last year. Of these 5,785 or 33.45 per cent. were found to be infected as against 7,419 or 42.0 per cent. last year. Mergui Jail reported the heaviest percentage of infection (57.03). No case of infection was found among 350 prisoners in Taungdwingyi Jail.

The Superintendents of four jails only, viz., Shwegyin, Mandalay, Shwebo and Myaungmya indented on the Government Medical Stores for chenopodium oil for the treatment of hookworm.

Mak-Aw-Lam.—Reports from District Health Officers indicate that the use of the term is spreading and there seems to be a widespread belief among laymen that *Se-sayas* are in touch with a hitherto unrecognised disease.

It appears that in the Shan States, although the matter has not yet been fully investigated, the name is given to cases of pernicious malaria but there is little doubt that cases of malignant pustule have also been so diagnosed there from time to time. In Burma proper however, practically every disease has been so diagnosed and the position has become a danger to the public, firstly to the individual on account of the treatment adopted, and secondly to the community because the diagnosis is so frequently used to conceal the occurrence of infectious disease. The village headman is only too ready to accept what appears to him to be an expert opinion that the disease occurring in his village is not plague but *Mak-Aw-Lam* and to abstain from reporting the facts.

It is scarcely necessary to state that there is no reason to believe that a disease unrecognised by practitioners of modern rational medicine is prevalent to the extent gossip and rumour might lead laymen to suppose. The diagnosis is used by *Se-sayas* simply to cloak their ignorance of medical science and as a means of building up a lucrative practice. They claim that pimples or boils on the buttocks are a diagnostic symptom and that it is necessary to "let out the poison" which they do by pricking them with any sharp instrument. If boils are not found, the buttocks are drawn apart in order to bring any piles into prominence and failing these the natural rugæ of the anus. These are then pricked to let out the poison in the shape of venous blood. Several reports have been received as to such cases having died a few days later, presumably of sepsis.

Most of the cases of *Mak-Aw-Lam* that District Health Officers have been able to mark down so far have on investigation proved to be either plague or small-pox.

Goitre.—Goitre is very common in some parts of the Province, particularly in the upper reaches of the big rivers. In the reports of District Health Officers this

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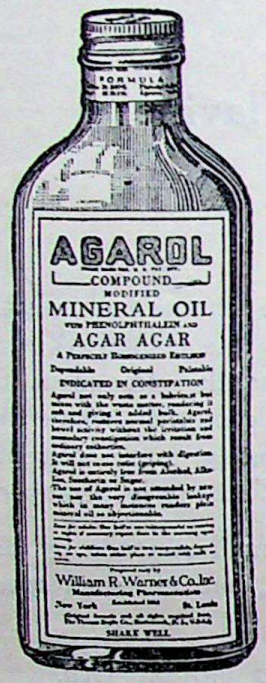

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recently stated a physician of broad experience and training, "led me to test it in a case of obstinate constipation that had received only indifferent and temporary relief from the usual laxatives, although careful attention had been paid to the patient's diet and hygiene.

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year, reference has again been made to the extreme prevalence of the condition in the States of Kyauksit and Chi in Pakôkku Hill Tracts where something like 98 per cent. of the women and 60 per cent. of the men are said to be affected. It is also reported to be very common in certain villages in Thazi Township, Meiktila District. The people in the worst affected areas look on the deformity as a normal condition and only seek relief where there is extreme discomfort or life is endangered. Progress is being made with iodine treatment in outlying dispensaries and the feasibility of the general application of preventive measures is under consideration, but naturally in dealing with primitive and superstitious folk great caution has to be exercised.

Schistosomiasis.—On account of the report by the Chief Medical Officer of the Burma Corporation, Namtu, of the presence of cases of infection with *Schistosoma japonicum* in the Northern Shan States and the possibility that although the majority of cases had come from the Yünnan, some may have been infected within British Territory, the Indian Research Fund Association provided funds for an investigation into the subject. A circular was issued to all Civil Surgeons in the Frontier areas giving particulars as to the diagnosis of the disease and the methods of collection of material for examination in confirmation of diagnosis. This has failed to bring to light any cases on which further enquiry could proceed. The funds being still available it is proposed in the coming year to have a Molluscan survey of the suspected area carried out and for this purpose the Director, Indian Museum, Calcutta, has promised to provide staff. This survey should result in determining whether the known intermediate host of the parasite exists under suitable conditions, and whether it is necessary to take special steps in regard to the disease.

Leprosy.—The year was marked by the formation of Sub-Committees of the British Empire Leprosy Relief Association in almost every headquarter town in response to the appeal for funds made by the Burma Branch of this body. These committees collected subscriptions amounting to Rs. 57,344 during 1925.

The Commissioner, Mandalay Division, convened a public meeting in connection with the above appeal and addressed it on the objects and aims of the Association. The address aroused great interest and induced many persons to present themselves at St. John's Leper Asylum for examination. Outdoor treatment of early cases was begun, but, as this necessitated the use of public vehicles owing to the Asylum being three miles out of the town, Dr. Peacock, Medical Officer of the Asylum, decided to open a small out-patient dispensary in the town proper. Mandalay is therefore the first town in the Province to have a leper dispensary where early cases can receive appropriate treatment which need not necessarily interfere with their daily work. Dr. Peacock deserves the greatest credit for his philanthropic work.

At the dispensary, 44 cases were treated during the period from 1st May 1925 to 31st March 1926 of which 8 cases too advanced for dispensary treatment were advised to enter the Asylum. Dr. Peacock sums up the conclusions arrived at after the first year's working as follows:—

(1) That out-patient leper clinics if cautiously conducted are readily taken advantage of in Burma.

(2) That such out-patient clinics within easy reach of the people and preferably apart from existing asylums and hospitals are necessary, as early cases who through fear of exposure and loss of employment would not be seen near an asylum do not mind attending at the clinic.

(3) That there is a greater possibility of getting in touch in course of time with the entire leper population, which will never be accomplished by the present system of resident leper institutions alone.

(4) That such clinics can be run at a very low cost. This clinic including equipment and a year's supply of E.C.O. cost roughly Rs. 200, but should cost an insignificant sum in future years, especially as the cheaper hydnocarpus oil is now used instead of E.C.O.

(5) That such clinics are unique in their position as centres for the propagation of a knowledge of leprosy to the afflicted as well as to the healthy members of the public, for without knowledge of the early signs and symptoms of the disease a patient can hardly be expected to seek advice before the disease is well established and unlikely to respond to treatment.

(6) That the clinic has shown the frequency of leprosy amongst Europeans and Anglo-Indians.

Expenditure on Civil Sanitary Works.—The total amount shown as spent on Civil Sanitary Works was Rs. 54,37,132 of which Rs. 49,72,735 were expended in towns and Rs. 4,64,397 in districts, representing 20.96 and 5.78 of the aggregate income of municipalities and districts respectively. Of the total income of Rs. 3,17,66,558, conservancy absorbed 6.01 per cent., water supply 5.87 per cent. and drainage 0.42 per cent. The proportion of expenditure on sanitary works to total income appears considerably greater this year than last.

Water Supplies.—During the year under review a third experimental tube well (10 in. Ashford Strainer) was sunk in Bassein Municipality and it is nearing completion. The Public Health Board has resolved during the year to sanction half the cost of sinking a tube well at Yegyi and also sanctioned a grant of Rs. 16,988 for the Insein water supply.

Anti-malarial Operations.—During the year malarial surveys of Bhamo Town, Thayetmyo Town and the Public Works Department Camp at Nyaunggyat were conducted by Assistant Surgeon E. S. Feegrade, I.M.D. Anti-malarial operations were continued in Kyaukpyu Town the cost being met by a grant of Rs. 6,000 made by the Provincial Public Health Board for the purpose. Costly anti-malarial measures for Akyab Town are under the consideration of Government. Jungle clearing and other minor anti-malarial measures have been carried out at a number of places, particularly in the lines of the Military Police Battalion stationed in Myitkyina District.

Port Health Department.—The number of sea going vessels examined on arrival was 1,321. They carried 444,206 persons including crew and passengers. In pursuance of the decision of March 1924, 112 Burma Coastal Vessels, carrying a crew of 8,147 and 10,898 passengers were not subjected to inspection. Vessels proceeding to ports beyond India numbered 543 or 39 more than the previous year. The effects of 33,695 Asiatic and African members of the crews and of the 18,776 deck passengers of these vessels were disinfected. Including Europeans, 47,876 crew and 24,574 passengers were medically inspected, of whom 119 were detained,—110 on account of a suspicious rise of temperature, one for plague, four for small-pox and four for chicken-pox. Baggage coolies numbering 3,059 were inspected and had their clothes disinfected prior to handling passengers' baggage.

Thanks to the generosity of Rao Bahadur S. R. Reddiar, Mr. T. C. Barnabas, K-I-H., and Mr. Hurry Krishna Pillay, M.B.E., the Port Health Officer was able to supply hot milk to all sick removed from ships prior to their transfer to hospital. The daily average attendance at the Port Commissioner's Dispensary was 112.05 making a total of 35,521.

The Harcourt Butler Institute of Public Health.—The building it was opened during 1926. The services of Military Assistant Surgeon G. Mackey, I.M.D., have been secured as Assistant Director. Major Jolly was deputed to select equipment in England during his leave.

Public Health Inspectors' Training Class.—Major Bilderbeck, I.M.S., Assistant Director of Public Health, was in charge of the class which was conducted on lines similar to those of previous years.

The class began with 31 students, 10 of whom were nominated by District Councils and Municipalities. Twenty-four students, including 8 of the previous years' failures, appeared for the final examination held in

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April; 13 passed, of whom 6 were nominated and 7 were private students.

Medical Inspection of Schools.—Out of a total of 285 schools on the list, 122 were in the charge of medical officers, but only 85 of the latter submitted inspection reports. Pupils examined numbered 22,451 as against 15,874 in 1924. Of these 993 (or 4.42 per cent.) were found unprotected against small-pox and 7,549 (or 33.18 per cent. as against 20 per cent. in 1924) were protected by re-vaccination.

It appears from the reports received that the care of teeth is still greatly neglected and the defective percentage remained about the same as last year (18.66 against 17.29 per cent. in 1924). Defective eyes (13.10 against 9.60 per cent. in 1924), throats and noses (23.83 against 19.26 in 1924) appear to have become more prevalent, but this is due to more careful examination of the children by school medical officers. Out of 22,451 pupils present, only 19,574 were examined in respect of nutrition and 956 (or 4.88 per cent.), and 4,968 (or 25.38 per cent.) were found poor and fair respectively. Considering the infantile mortality of the Province this is hardly to be wondered at, but it is probable that with the institution of ante-natal clinics and the growth of the Child Welfare movement, the general standard of nutrition of the younger generation will be raised. Another factor tending to discredit the value of these figures is that at present the standards are arbitrary and depend upon the personal opinion of the inspecting medical officers;—whereas it is hoped that with the introduction hereafter of touring school medical inspectors associated with this Department it will be possible to judge all children in the schools of this Province by the same standard.

The Medical Officer of St. John's College, Rangoon, attributes the ill-health of his students to the unsatisfactory municipal conservancy and lack of parental interest in acting upon advice given in respect of the children inspected. The Director, St. Paul's Institute, Rangoon, similarly remarks that few parents or guardians took any notice of the Medical Officer's recommendations. The Medical Officer of the American Baptist Mission Karen High School, Henzada, remarks that among the boarders considerable success followed his treatment, while less success was noted amongst day pupils, whose parents were apathetic and uninterested. He considers that this school is more interested in the medical inspection than are certain other schools examined by him and therefore shows the value of such examination to a more marked degree. The Headmaster, American Baptist Mission Morton Lane School, Moulmein, however, considers that the present system of school medical inspection has resulted in the treatment of many children (e.g. provision of spectacles, etc.), and that it has been of benefit to the whole school.

These reports are rather more encouraging, and show that benefit will accrue from the help given, if only the people will learn to help themselves. The sanitary condition of school buildings, arrangements for water supply and conservancy, with few exceptions were generally reported as good. Advice was given by this Department for remedying defects noted on perusal of inspection reports.

So far as repairs and structural improvements were concerned the Education Department always complied with necessary action so far as financial resources permitted,—but there is much more to be done in collaboration between school authorities, medical officers and parents or guardians. Courses in hygiene and sanitation for teachers are now under consideration,—because in some ways, as for example the application of personal hygiene, they are far more usefully placed for correction than are the Medical Officers. But with the best school medical organisation in the world little can be done to improve the health and physical and mental welfare of the children unless parents and guardians will rouse themselves from their apparent apathy and take some interest in the matter.

Rangoon Health Week.—The Exhibition held in 1924 under the auspices of the Popular Health Education Sub-Committee of the Burma Branch of the Indian Red Cross Society was of comparatively limited scope as it was more or less experimental, but it proved so popular and was so crowded that it was considered necessary not only to extend the scope of this Exhibition but to occupy a much larger area. Nevertheless, although it was open for six days instead of three as last year, it was overcrowded during the whole week and those in charge of the various stalls were kept very busy explaining the exhibits to a continuous stream of eager enquirers. Two days were set apart as Ladies' Days and on these occasions large numbers of women, many of whom were "purdahnashin" visited the Exhibition and displayed the greatest interest in all that they saw.

During the "Week" lectures on health subjects in all the different languages spoken in Rangoon were given in the Exhibition ground and in many places throughout the town both indoors and outdoors—in fact wherever an audience could be assembled.

The "Week" was an unqualified success and reflected the greatest credit on the organisers.

Correspondence.

A CATARACT FAMILY.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—The following history of a "cataract family" may interest your readers, and I hope that you will kindly publish it.

Lilabati, Hindu female, aged 18 years, was admitted to the B. N. Railway Hospital, Garden Reach, Calcutta, for operation for cataract. On admission, her family history was taken and was found to be very interesting and the relatives were examined with the results noted below.

Mother, aged about 50 years, had cataract in both eyes. The right eye was operated on in 1926 with a satisfactory result. An immature cataract is present in the left eye.

Two brothers.—Elder, aged 33 years, had cataract in both eyes; both were operated on in 1917; result good. Younger, aged 29 years, had cataract in both eyes. The right eye was operated on in 1925; result good. The cataract in the left eye is now mature.

Five sisters.—(1) Eldest, aged 22 years, has no cataract. (2) Second, aged 20 years, has no cataract. (3) The third, aged 18 years had cataract in both eyes. The right eye was operated on on the 23rd February 1927. A cataract is commencing in the left eye. (4) The fourth sister, aged 14 years, has immature cataract in both eyes. (5) The fifth sister, aged 11 years, has had cataract of one year's duration in both eyes; these have the appearance of wheel spokes, starting from the periphery of the lens and radiating towards its centre.

It will be seen that the mother, two brothers, and the three out of the five sisters have cataract, although all—with the exception of the mother—are still young. The father, uncle and grandparents have no cataract as far as could be ascertained.—Yours, etc.,

G. C. CHATTERJEE,
Assistant Surgeon.

B. N. RAILWAY HOSPITAL,
GARDEN REACH,
10th March, 1927.

RECOVERY AFTER APPARENT DEATH.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—In your issue for December 1925, Major Kapur, I.M.S. of the Medical College Hospital, Calcutta, recorded recovery after apparent death on the operating table, after breathing had been suspended for fifteen minutes. The following very remarkable instance of recovery six hours after apparent death is recorded by Dr. H. M. Shelley in the *Kenya Medical Journal* for September, 1926, p. 174, and abstracted in the following terms in the *Journal of the American Medical Association* for the 11th December 1926, p. 2036.

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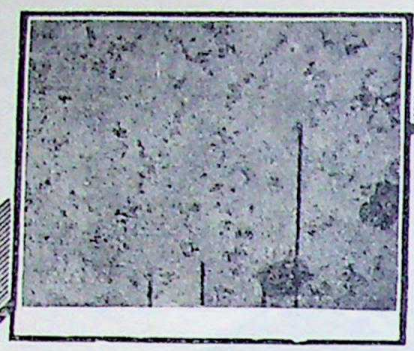
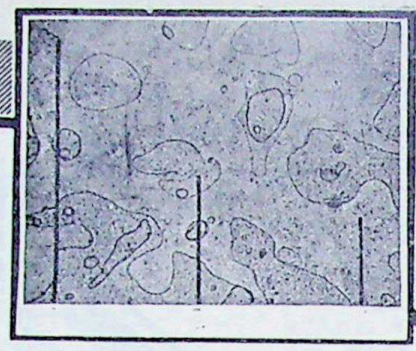


Micro-photograph of stool after Petrolagar administration, showing complete emulsification and thorough admixture with intestinal content.
(1) *Epithelial Cells,* (2) *Microscopic Oil Globule,* (3) *Agar-Agar Granule,* (4) *Fæces.*



Micro-photograph of fæces after administration of plain mineral oil, showing complete absence of emulsification: this explains why mineral oil always leaks.
(1) *Epithelial Cells,* (2) *Oil Globule,* (3) *Fæces.*

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THE micro - photographs clearly demonstrate the superiority of Petrolagar over ordinary liquid paraffin in the treatment of constipation. On the left the perfect admixture with the intestinal content obtained with Petrolagar is apparent; the other photograph, in which large unemulsified globules of oil are present, explains at a glance why plain mineral oil never has solved and never can solve the problem of constipation. It also shows why mineral oil leaks

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There is no taste of oil, so that the most fastidious patients take the product readily. In the treatment of chronic constipation, Petrolagar gives results unobtainable by any other method and breaks the vicious circle set up by the habitual use of drastic purgatives. The medicinal paraffin is so finely divided that it is thoroughly disseminated throughout the fæcal mass, thus leakage is almost entirely eliminated; the agar-agar is specially prepared so as to yield on incubation in the intestinal tract many times its original bulk, forming a bland gelatinous mass which is completely and readily eliminated, acting indeed, as a soothing emollient to the inflamed intestinal mucosa.

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"Shelley reports the case of a woman whose throat had been cut with murderous intent. When he saw her, life was apparently extinct; the woman was not breathing and there were no signs of heart action to be obtained. Three hours later the body arrived at the mortuary for a necropsy. As the work was about to be undertaken, it was noted that the woman was breathing slowly and deeply, and a quick, thready pulse was palpable in the radial artery. All cut vessels in the neck were tied immediately; a tracheotomy tube was inserted into the cut trachea, and saline solution was administered intravenously. Within thirty minutes, the woman regained consciousness. However, she died from asphyxia ten hours after Shelley first saw her. *The woman had been apparently dead for six hours previous to receiving treatment*, and she revived in spite of the fact that the left carotid and left superior thyroid arteries, the left internal and external jugular veins and the trachea had been severed completely."

The case appears to have been a most unique one, and one without any precedent.—Yours, etc.,

R. K. BASU,
Medical Officer, Dukma Hospital, Bihar and Orissa.

16th February, 1927.

THE PERNICIOUS ANÆMIA OF PREGNANCY.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—I was very much interested in the article on this subject by Lieut.-Col. V. B. Green-Armytage, I.M.S., in your issue for last May. It is one, the ætiology of which badly needs investigation in India. The condition is very frequent in Bengal; during my practice of over twenty-five years' duration in this province I have seen over a hundred cases of it.

Colonel Green-Armytage mentions four possible terminations. May I add a fifth?—*viz.*, death, if the uterus be not evacuated. Some six weeks ago I had a patient, a 2-para, suffering from the pernicious anæmia of pregnancy in the fifth month of gestation. The patient was treated by blood transfusion and with various other remedies. I called in a consultant, but he advised against evacuating the uterus, on account of the risks of sepsis. The patient died ten days later. Personally, I have only once carried out evacuation of the uterus for the pernicious anæmia of pregnancy, but I have had occasion to empty the pregnant uterus on several occasions on account of other conditions and have not yet encountered sepsis as a sequel. Of course such gravely anæmic patients are especially liable to septic infection, but one would welcome an expression of opinion as to the correct procedure in such cases of grave anæmia setting in during early pregnancy.

On analysing my hundred cases, they fall roughly into the following groups;

(1) Death during labour. This occurs in some 25 per cent. of untreated cases. (These were cases in which I was called in immediately before or just after death.)

(2) Death within a week after delivery. This occurred in about half the cases and was accompanied by symptoms of intense dyspnœa.

(3) Death some weeks or months after delivery. This is not uncommon. Also it is very common in a subsequent pregnancy; quite half the patients whom I had saved from the condition in a previous pregnancy died in a subsequent pregnancy, usually within a week after delivery. Two patients had a third or fourth relapse of the grave anæmia weeks or months after delivery, and then died.

(4) Very rarely a rapid spontaneous cure sets in after delivery. About 20 per cent of cases show this, but some of them relapsed later into an acutely anæmic condition and died.

With regard to associated symptoms, gastro-intestinal disturbances predominate, whilst many—perhaps most—cases show enlargement of the liver and spleen. I have seen troublesome and persistent cough with dyspnœa persisting until the fatal termination in many cases. The characteristic symptoms of pernicious anæmia—the lemon-yellow tint of the skin, the retention of fat, the muscular prostration, palpitation, headache, dyspnœa, vertigo, œdema, etc.—are all present, but a condition of hyperchlorhydria rather than of hypochlorhydria is usually found. A fever of low type is always present. Kala-azar is so prevalent in this part of Bengal that its presence together with pregnancy is sometimes mistaken for the true pernicious anæmia of pregnancy; unfortunately Napier's aldehyde test is sometimes positive in the latter disease, thus confusing the diagnosis.

Much further information with regard to the disease—especially with regard to its causation, and the best lines of treatment—is badly wanted.—Yours, etc.,

J. N. GHOSAL, L.M.S.

BASIRHAT, BENGAL,
2nd March, 1927.

(*Note.*—We have shown the above letter to Colonel Green-Armytage, who remarks that in such cases the best procedure is probably to leave the patient alone; the use of tents or the castor oil-quinine method of securing evacuation of the uterus may however be tried. The risk of sepsis is so great that manual or instrumental interference inside the uterus is contra-indicated.—EDITOR, *I.M.G.*).

FILARIAL HÆMATURIA.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—Filarial disease is very common in Rangpur District, especially in the sub-division of Nilphamari. In the early stages there is often periodical swelling of the inguinal glands, attended with severe pain, shivering, and fever; this persists for a week, and then passes off again, to re-appear a fortnight or a month later. After several such attacks swelling of the scrotum or of one leg appears, going on gradually to elephantiasis. Most of such patients are treated by village quacks, and we only rarely see early cases. I have seen cases of elephantiasis in children of 7 or 8 years of age, but this is exceptional, and the majority of cases are in persons over 25 years of age. One patient of 7, whom I was treating by inunctions of a mercurial ointment, and injections of soamin, discontinued treatment after the second injection as she feared the hypodermic syringe.

Hæmaturia and chyluria due to *Filaria bancrofti* are also not uncommonly seen in this district, and again most of the sufferers are treated by village quacks, since they are not bed-ridden and not sufficiently ill to seek for hospital treatment. These quacks inform the patients that they are suffering from a form of gonorrhœa—*pachadhat*—, and as their treatment invariably fails, the patient usually next consults a soothsayer, who refers him to a second quack, with the result that in the long run he is ruined in purse and in health. The treatment of such cases is not easy, but details of the following cases may be of interest.

Case 1.—Hindu male, aged 24, of healthy appearance and well built. He had been suffering from hæmaturia for a month, followed by two months without hæmaturia, and then a recurrence of the condition. At first the hæmaturia only occurred after the night's sleep, but later there was also hæmaturia during the day time. He was suffering from much pain and trouble by blocking of the urethra by clots, and this drove him to seek relief from the hospital. The treatment adopted was calcium lactate, hamamelis, and ergot by the mouth, and injections of soamin. Within 48 hours the hæmaturia commenced to clear up, but he then unfortunately left hospital, and I have not been able to trace him since.

Case 2.—Hindu male, aged 22 years, with a history of hæmaturia of more than a year's duration. He only stayed under treatment for three days and then absconded, and I have not seen him since.

Case 3.—Hindu male, aged 32 years, with a history of passing clots and chyluria of eight months' duration, and of daily fever. On admission he was much

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emaciated and very weak. Calcium salts were given by the mouth and vaccine hypodermically without benefit. I then began injections of soamin; after the second injection the blood disappeared from the urine, and the milkiness was markedly less; after the fifth injection the fever stopped and the urine became clear. Later however chyluria again set in, and the patient absconded from hospital.

I write to ask whether any of your readers can inform me of any satisfactory line of treatment for such cases. As matters are at present, in the long run the majority of patients die after a period of prolonged illness and suffering.—Yours, etc.,

T. N. CHAKRAVARTTY, L.M.S.

NILPHAMARI, RANGPUR DISTRICT,
8th March, 1927.

ARTHRITIS OF BOTH ELBOW JOINTS FOLLOWING SMALL-POX.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—I was consulted in October 1926 by a Mahomedan boy, aged about 17 years, a *faqir* by profession, for painful swelling of both elbow joints.

He gave the following history; that he had gone down with fever on the 10th September 1926 at Gujar Khan, a town in the north of the Punjab. This had developed into small-pox. The tenth day after the appearance of the eruption, pain and swelling set in in both elbow joints. The fever and eruption cleared up, but the swelling in the joints increased, and when I saw him both joints were ankylosed in a semi-flexed position. His arms were practically useless to him, and for the past few days he had been fed by a friend, as he was unable to raise his hands to his mouth.

I know of no record of arthritis as a sequel of small-pox, but a brother practitioner who was with me at the time said that he had seen cases of joint disease following as a sequel of small-pox. Have any of your readers any experience of a similar condition?—Yours, etc.,

GOPAL SINGH CHAWAL, M.B., B.S.

39, TEMPLE ROAD, LAHORE.

(*Note.*—Taylor's *Practice of Medicine*, 1922 edition, mentions multiple neuritis as a sequel of small-pox, but not arthritis or synovitis.—EDITOR, *I.M.G.*).

SELF-INFLICTED INJURIES.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—The ordinary Indian criminal is not wanting in intelligence, and not infrequently innocent persons are sent to jail because the medical officer who examines the complainant is deceived by self-inflicted injuries. In the Punjab at least, many pitfalls await the doctor who is new to medico-legal work. The following are a few types of self-inflicted injury which I have come across in medico-legal cases.

(1) A close-set series of tiny incisions is sometimes made to simulate inflammation due to a blow.

(2) An oblique incision across the forehead is sometimes made with a knife to simulate a blow with a stick or *lathi*. In such cases the incision is usually made with the right hand, and the direction of the incision shows this.

(3) A rectangular, shiny patch on the surface of the chest will sometimes arouse suspicion; it is usually self-inflicted by caustic and claimed to be the result of a blow.

(4) The mark left by a heated rupee on the back is not infrequently attributed to a blow from a *lathi*. In the former case, desquamated scales of skin are usually seen if the injury is fresh, and there is no deep bruising, with ecchymosis.

(5) A heated rupee is sometimes passed over the skin from the back round to the front of the chest to simulate a blow from a stick or *lathi*; such an injury however could not be produced by such a weapon.

(6) An occasional determined criminal will inflict a really severe injury or cut upon himself, but if he does so, he frequently fails to reproduce the corresponding cut in the clothes over the site of "injury," or produces a cut in the clothes which could not correspond to the injury if it was inflicted by a blow.

Is it not necessary that medical students when undergoing their training in India should be taught about such matters?—Yours, etc.,

RUDA DUTT, L.M.S.,
Assistant Surgeon.

CIVIL HOSPITAL, MAILSI, PUNJAB,
15th February, 1927.

WHITE ASPHYXIA IN MALE CHILDREN.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—Some time ago I was called to attend a Hindu lady of good social position in her confinement. She was a multipara, a mother of four male and two female children. All are alive, with the exception of the first male child. In every case the delivery was normal and easy.

On enquiry, the husband informed me that all the four male children previously born had been born in a state of apparent death. The first male child was born in a village and the labour attended by an untrained *dai*, who considered that the child was dead and therefore buried it. The second child was a female, and was born in a healthy state. The third child was a male; fortunately the confinement took place in a town and was attended by a physician; the child was born in a state of white asphyxia, but its life was saved by the doctor. The fourth and sixth deliveries were also of male children; both were born in a state of white asphyxia, but both were saved by the efforts of the doctors in attendance. The fifth child, a female, was quite healthy when born.

This being the patient's seventh confinement, she was delivered of a male child, which was apparently dead. The placenta was expelled immediately after birth of the fœtus. Delivery was normal and easy. The child was in a condition of apparent death, white, with closed eyes, a cold skin, motionless, and he made no cry. There was no sign of respiration. The heart sounds were present, but very feeble. After ten minutes of efforts to restore respiration, voluntary respiration ensued, but it was half an hour before the child made a cry. Since then I have seen the child, and he is well and fit.

Why should the *male* children of a mother all be born in a state of white asphyxia, whereas the two female children were not in this condition when born?—Yours, etc.,

M. DAS GUPTA,
Sub-Assistant Surgeon.

BAGMARA DISPENSARY,
GARO HILLS, ASSAM.

A CASE OF DELAYED LABOUR.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—The following case is one of interest, and I would be glad if any of your readers could throw any light upon its causation.

The patient, a primipara, aged 22 years, was operated upon after marriage—dilatation of the cervix and curetting being carried out—and six years after marriage became pregnant. From the early months the uterus was disproportionately large and twins were suspected. Quickening occurred in the third month and vigorous fœtal movements were felt in the fourth month.

On the 292nd day after the first day of the last menstruation, blood mixed with a glairy fluid was discharged from the uterus and labour pains set in a few hours later. When the cervix was dilated, quinine was administered by the mouth, but without result. The membranes did not rupture till five days later. The lady doctor in attendance waited for some hours in the hope that spontaneous delivery would ensue, but uterine contractions ceased with the head engaged in the outlet. The fœtus being alive, an attempt was first made to

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Vitamins and Infant Feeding

The vitamin content of the milk depends on the diet of the animal producing it. *(Biochemical Journal, 1924).*

Glaxo is produced from the milk of cattle fed on green, succulent grass all the year round, and is therefore always rich in vitamins.

Glaxo is prepared by a process which prevents oxidation *(British Medical Journal, Jan. 23rd, 1926),* and thus avoids destruction of the vitamins.

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STERILITY IN WOMEN

PLURIGLANDULAR Therapy is the most rational method of treating functional sterility.

A great deal of clinical experience during the last ten years proves that not merely are abnormal menses regulated and the psychic and neurotic manifestations controlled, but that the sterility is cured.

One case of ovarian insufficiency in whom menstruation had been absent for six years recently has completed a normal pregnancy. The only treatment used was

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deliver it by forceps, but this failed, and ultimately perforation and craniotomy had to be resorted to. The patient made a good recovery.

Prior to her pregnancy the patient's catamenial periods were regular and occurred every 29th or 30th day, and lasted a week. It is not clear whether the delay in the onset of labour was due to a contracted outlet or to a disproportion between a large fœtus and the parturient canal. The fœtus was a male child, and looked rather big. We hope to carry out internal pelvimetry as soon as the patient is fit again.

Can any of your readers suggest the best procedure for such cases?—Yours, etc.,

M. ASLAM AMAR, L.M.P.

BAR ASSOCIATION, GONDA, OUDH,
16th February, 1926.

Erratum.

In the Correspondence column of our issue for March 1927, on p. 175 please read "P. A. Narayana Iyer" in place of "L. R. Narayana Iyer."—EDITOR, *I.M.G.*

Service Notes.

APPOINTMENTS AND TRANSFERS.

Major-General A. Hooton, C.I.E., K.H.P., I.M.S., Surgeon-General, Bombay, is appointed to officiate as Director-General, Indian Medical Service, during the absence on leave of the Hon'ble Major-General T. H. Symons, C.S.I., O.B.E., K.H.S., I.M.S., with effect from the date on which he assumes charge.

The services of Colonel R. A. Needham, C.I.E., D.S.O., I.M.S., are replaced at the disposal of the Government of the Central Provinces with effect from the 26th February, 1927.

Lieutenant-Colonel G. Hutcheson, M.B., I.M.S., is appointed to officiate as Inspector-General of Civil Hospitals and Prisons, Assam, with effect from the afternoon of the 31st January, 1927, and until further orders.

Lieutenant-Colonel J. Cunningham, I.M.S., is confirmed as Director, Pasteur Institute, Kasauli, with effect from the 3rd February, 1927.

Lieutenant-Colonel L. E. Gilbert, C.I.E., M.D., I.M.S., is appointed to officiate as Inspector-General of Civil Hospitals, Burma, with effect from the date on which he assumes charge and until further orders.

Lieutenant-Colonel J. Masson, M.B., F.R.C.S.E., I.M.S., is appointed to officiate as Inspector-General of Civil Hospitals, Bihar and Orissa, with effect from the date on which he assumes his duties and until further orders.

The services of Major L. S. Modi, I.M.S., are placed permanently at the disposal of the Government of Bihar and Orissa for employment in the Jail Department.

The services of Major O. R. Unger, I.M.S., are placed permanently at the disposal of the Government of Bihar and Orissa for employment in the Jail Department.

The services of Major R. V. Martin, I.M.S., are placed permanently at the disposal of the Government of Bombay, with effect from the 1st March, 1927, for employment in the Jail Department.

Major M. A. Nicholson, I.M.S., is appointed substantively to be an Agency Surgeon under the Government of India in the Foreign and Political Departments, with effect from the 29th July, 1926.

The services of Major S. D. Sondhi, M.C., M.B., I.M.S., are placed temporarily at the disposal of the Government of the Punjab for employment in the Jail Department, with effect from the date on which he assumes charge of his duties.

Major N. D. Puri, I.M.S., assumed charge as Officer on Special Duty in the office of the Inspector-General of Prisons, Punjab, at Lahore, on the afternoon of 22nd February, 1927, from Lieutenant-Colonel A. W. Greig, I.M.S., proceeding on leave.

The services of Major R. R. M. Porter, M.C., M.B., F.R.C.S.E., I.M.S., are placed temporarily at the disposal of the Government of Bihar and Orissa, with effect from the forenoon of the 7th February, 1927.

Subject to His Majesty's approval Dr. Kulwant Rai has been appointed permanently to the Indian Medical Service as Lieutenant by the Right Hon'ble the Secretary of State for India. His Commission will bear date 24th January, 1927.

LEAVE.

The Hon'ble Major-General T. H. Symons, C.S.I., O.B.E., K.H.S., I.M.S., Director-General, Indian Medical Service, is granted leave on average pay for six months with effect from the 8th April, 1927, or the subsequent date on which he avails himself of it.

Colonel H. Ainsworth, F.R.C.S., K.H.S., I.M.S., Inspector-General of Civil Hospitals, Bihar and Orissa, is granted leave, pending retirement, on average pay for 1 month and 14 days and on half average pay for 9 days, with effect from the 10th March, 1927.

Colonel A. Fenton, M.B., I.M.S., Inspector-General of Civil Hospitals, Burma, is granted, with effect from the 24th March, 1927, leave on average pay for 8 months pending retirement.

PROMOTIONS.

The promotion of Major J. A. A. Kernahan, I.M.S., notified in Army Department Notification No. 225, dated the 10th February, 1922, is antedated from 29th January, 1922 to 29th July, 1921.

Captains to be Majors.

A. Y. Dabholkar, M.C., M.B. Dated 2nd February, 1927.

R. N. Khosla, M.B. Dated 23rd February, 1927.

R. N. Kapadia, M.C., M.B., F.R.C.S.E. Dated 25th February, 1927.

S. A. McSwiney, M.B., F.R.C.S.I. Dated 26th February, 1927.

H. S. Rajan, M.B. Dated 26th February, 1927.

F. Oppenheimer. Dated 30th July, 1926.

S. D. Sondhi, M.C., M.B. Dated 20th January, 1927.

Lieutenants to be Captains.

S. D. Gupta, M.B. Dated 7th August, 1926.

D. Mac D. Fraser, M.B. Dated 25th February, 1927.

NOTES.

WATSON'S *MICROSCOPE RECORD.*

IN continuing the regular publication of their *Microscope Record* Messrs. W. Watson and Sons, Ltd., place the whole body of microscopists and laboratory workers under an obligation to them. The latest issue which we have received—No. 10, for January, 1927—is of great interest. It includes in the first place a discussion on binocular types of microscopes or microscope eyepieces; secondly, a valuable article by Dr. F. J. Brislee, D.SC., F.R.M.S., on critical illumination in microscopic work. This contains many useful "tips," even for the trained laboratory worker. Mr. G. T. Harris, Hon. Member of the Quekett Microscopical Club continues his studies of the Desmidiceæ, whilst Mr. Walter Bagshaw writes on the microscope as a hobby. Finally, Dr. A. C. Coles—one of the best-known microscopists of to-day in the British Isles—contributes a chapter on the relief staining of bacteria, protozoa, and infusoria—a most valuable chapter, from which we hope subsequently to publish abstracts, since such methods are of particular value from the doctor's point of view in studying and identifying spirochætes. The notes and queries section also contains many useful hints. One of these may be mentioned; that Messrs. Watson and Sons issue at the price of 9*d*. each specially prepared glass spreaders for preparing thin blood films; such spreaders will almost certainly give better and more uniform films than the use of casually selected glass slides.

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The *Microscope Record* is available on application to Messrs. Watson and Sons, Ltd., 313, High Holborn, London, W.C.1. In general, the medical man finds that the issue of trade journals is apt to confuse rather than help him, but this journal is an entire exception to this rule; it is one which is of real value and help to the laboratory worker.

LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE.

(Division of Tropical Medicine and Hygiene.)
EXAMINATION RESULT. 81st SESSION.
OCTOBER 1926—FEBRUARY 1927.

Passed with Distinction:—

H. W. Kumm—Winner of "Duncan" Medal.
P. H. Martin.
C. L. Bilderbeck.
B. Williamson.
E. S. Anthonisz.
S. G. Harrison.
H. M. Shelley.
N. P. Dalal.
L. W. Evans.
R. D. Gross.
H. S. Townsend.

Passed:—

R. G. Keays.
T. B. M'Aleer.
J. Portelli.
H. M. Russell.
E. K. Stuart.
W. A. Young.
W. Young.
F. A. J. Bouloux.
W. Chisholm.
K. Halloran.
H. M. King.
H. O. Newell.
T. O'Carroll.
C. V. Burne.
L. M. Maybury.
K. P. Menon.
N. H. Tadiwala.
J. A. Acheson.
H. C. V. de Silva.
F. R. L. Miller.
I. J. Patel.
S. T. M. Sang.
S. C. Chopra.
A. G. Coia.
J. V. Karve.
F. R. Lockhart.
M. P. O'Connor.
G. W. Vaughan.
T. B. Gilchrist.
J. H. Hislop.
N. Vane Percy.
G. Simpson.
H. Hoakai.
J. P. Mitchell.
J. S. Oliphant.
J. H. Penman.
H. I. Robertson.
J. N. Hay.
A. D. Loganadan.
P. L. Whig.
E. Stuart-Taylor.
E. C. A. Fristedt.
M. M. Nolan.
J. Pattis.
F. M. Frost.
Ou, Koh Boo.
K. A. Maclean.

HORLICK'S MALTED MILK CALENDAR.

WE have received—unfortunately somewhat late in the year—copies of Horlick's Malted Milk Calendar for 1927. It is one which will interest Indian practitioners for it is most brilliantly and artistically coloured, and is a real work of art. The subject selected is Kalidas's heroine Shakoontala, a heroine who is better known in India, even among the illiterate, than is Shakespeare's Miranda in England. Her story is one which Rabindranath Tagore has immortalised.

The calendar illustrates the heroine and her companions in the letter-writing scene, and flower-strewn bench, mango tree, and the Arabian jasamine creeper are all well depicted, whilst very noticeable is the concentration of the eyes of all the figures from the king to the gazelle on the heroine. The artist has struck the true spirit of Kalidas—

"Yet may I enter through the door
That mightier poets pierced of yore;
A thread may pierce a jewel, *but*
Must follow where the diamond cut."

Copies of the calendar are available gratis to medical men who apply to the Indian Agents of Messrs. Horlick and Co., i.e., Messrs. A. H. Wheeler and Co., Mercantile Buildings, Calcutta.

"E. C."

SINCE its first introduction by Mr. C. M. Hutchinson, C.I.E., as the result of his research work, "Electrolytic Chlorine" has become a favourite antiseptic for surgical use in India, and is very largely used in public health work to sterilise water supplies. Every report which mentions its use of recent years speaks extremely favourably of it; and its special claims to stability have been borne out repeatedly by analysis from time to time by official laboratories. Messrs. Sarkar, Gupta and Co., 47, Bose Para Lane, Calcutta, are manufacturers of this compound, and have recently been manufacturing it with a special and improved type of electrolyser designed for use in the tropics. Their contention that it contains 2.5 per cent. of available chlorine has been borne out by recent tests; in fact one sample recently analysed in an official laboratory in Calcutta gave a content of 2.51 per cent. The compound has many advantages over eusol; it has greater penetrating power, it does not cause coagulation with serum—as does iodine, it is devoid of free alkali, and entirely non-irritant. In eye work it is one of the very best antiseptics available.

"E. C." stands on its own merits, and is coming more and more into use in India, but our readers may like to note the address of wholesale suppliers.

SERVICE SUGGESTIONS.

Service Suggestions is a bi-monthly publication issued by the International General Electric Co., Exchange Building, Ballard Estate, Bombay, P. O. Box 992, and is issued free to medical men who apply for it. It deals with physical therapy, electro-medical, ultra-violet light, and radiographic matters generally. The number for January-February 1927 contains articles on the physical therapy department of a hospital—how to set it up and run it; the rules of the American Medical Association on physical therapy to be followed with reference to the standardisation of apparatus; "rapid fire" radiography with the fluoroscopic screen; Coolidge tube "repairs"; and protection from an *x*-ray standpoint. Many of our readers, both radiologists and others, may be interested in the journal. It is very well illustrated, and contains items of interest.

Publishers' Notice.

SCIENTIFIC Articles and Notes of interest to the profession in India are solicited. Contributors of Original Articles will receive 25 reprints *gratis*, if asked for at the time of submitting their manuscripts.

Communications on Editorial Matters, Articles, Letters and Books for Review should be addressed to THE EDITOR, *The Indian Medical Gazette*, c/o The Calcutta School of Tropical Medicine, Central Avenue, Calcutta.

Communications for the Publishers relating to Subscriptions, Advertisements, and Reprints should be addressed to THE PUBLISHERS, Messrs. Thacker, Spink & Co., P. O. Box 54, Calcutta.

Annual Subscription to "The Indian Medical Gazette," Rs. 16 including postage, in India. Rs. 18 including postage, abroad.

Papers and articles forwarded for publication are understood to be offered to *The Indian Medical Gazette* alone, and any breach of this rule will be followed by non-publication.

The Editors of *The Indian Medical Gazette* cannot advise correspondents with regard to prescriptions, diagnosis, etc., nor can they recommend individual practitioners by name, as any such action would constitute a breach of professional etiquette.

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Original Articles.

THE GEOGRAPHICAL DISTRIBUTION OF SOME OF THE DISEASES OF INDIA.

By J. W. D. MEGAW, C.I.E.,
LIEUT.-COL., I.M.S.,
Director, Calcutta School of Tropical Medicine,

and

J. C. GUPTA, M.B.,
Registrar, Carmichael Hospital for Tropical Diseases, Calcutta.

THIS note deals with information supplied by 240 civil surgeons, each of whom has replied to a series of questions contained in a questionnaire issued by us.

There has been a good deal of delay in producing this report because a small minority of the civil surgeons failed to co-operate, and even now there are certain districts from which no replies have been received.

On the whole a very satisfactory response was made to the request for information, and our thanks are due to the civil surgeons and the heads of the medical departments of the Provinces and Indian States who have taken so much trouble in helping with the survey.

The objects of the survey were to collect together in a concise form what is known of the geographical distribution of the more important diseases of India and to call attention to the need for a more accurate survey.

The present survey, being based on the clinical observations of practitioners, cannot claim to any great degree of accuracy, for although the civil surgeon is usually a medical man of exceptional ability and experience, he seldom has the advantages of laboratory aids for his diagnosis. In the case of some diseases, information from the man on the spot is quite reliable when the disease can be recognised by clinical observations, for example, lathyrism, plague, goitre, blackwater fever, cataract, stone, guinea-worm, etc. Other diseases will be recognised by some doctors and overlooked by others; such are aortic disease, general paralysis of the insane, yaws, etc.

There are some diseases in which there is no criterion by which a diagnosis can be made; there may be a sharp difference of opinion as to whether a case of fever should be called dengue or sandfly fever, or whether a case should be called epidemic dropsy or beriberi.

In spite of these and other sources of error, it is likely that the reports which are analysed in this note and the maps which are published with it will give a more accurate impression of the occurrence of many Indian diseases than has hitherto been available. No claim for accuracy in detail can be made; it is not safe to assume that a disease is absent from any district which does not report its occurrence, but in most cases the broad impressions formed from a study of the maps and tables can be relied on as being approximately accurate. Where there is good reason to believe that the information is misleading, a note of caution is expressed in the text. Malaria has been excluded from the survey as this disease has been thoroughly dealt with by the Malarial Bureau under Colonel Christophers and a detailed map of the incidence of malaria has been issued recently.* Hookworm disease also is not included, as this disease cannot lend itself to a survey of this kind, and Dr. Chandler has made a broad survey of its distribution on lines which are far more likely to yield accurate results.

Most of the replies were received in the years 1923-1924, but some have been received as late as 1926. In some cases the maps have been revised in the light of information which is believed to be more accurate than that supplied in the answers to our questions, but on the whole the maps and tables represent the impressions and personal knowledge of the medical officers on the spot.

SYNOPSIS OF THE REPLIES OF CIVIL SURGEONS.

TYPHOID FEVER.

This disease appears to be common all over India. Replies were received from 209 civil surgeons. The summary of these is:—

	(a) In Adults.	(b) In Children.
Common in ..	121 districts	125 districts
Rare ..	71 „	68 „
Unknown ..	17 „	16 „
Total number of districts ..	209 „	209 „

The senior author's personal impression, based on a fairly large experience, is that typhoid fever is far more common in children than in adults in India. There is reason to believe that in many places in India, nearly every child gets typhoid fever before reaching the age of 12 years. The comparative infrequency of the disease in adults is probably due to the immunity which persists from attacks occurring in childhood. These attacks are seldom recognised, as the disease tends to be mild in young children and a medical man is seldom consulted.

TYPHUS FEVER.

The only positive reports of the occurrence of this disease were the following:—

1. Bengal—The only report was from Darjeeling where the civil surgeon states "I believe there were several cases in 1921."
2. Burma—50 cases were reported from Bhamo from insanitary and crowded villages in the Chin hills.
3. Bihar and Orissa—one probable case in Saran.
4. United Provinces—(a) Nainital—1 case; (b) Almora, rare; (c) Gharwal—8 cases; (d) Tehri Garhwal—"Yes."

* *Vide Indian Journal of Medical Research*, July, 1926.

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5. Punjab—Simla Hills, Lahore, Mianwali and Amritsar report isolated cases or small outbreaks.

6. The N.-W. F. Province reports considerable outbreaks from Kohat (500 cases), and Peshawar (128 cases).

7. Central Provinces—1 case from Saugor.

Madras and Bombay do not report any cases. Louse-borne typhus is probably not so rare as the above summary would suggest, but even if full allowance be made for the possibility of small outbreaks being overlooked, the fact remains that India as a whole is remarkably free from typhus fever.

The cases from Nainital, Almora and Saugor were probably "tick typhus." This disease is known to occur in these localities as well as in various localities in the Central Provinces, the Orissa Feudatory States, etc.

A typhus-like fever occurs in India, probably transmitted by ticks. Cases of typhus-like fever occurring shortly after the bite of a tick have been reported from

(1) The Kumaon Hills near Sath Tal Lake.
(2) Naraingunge, in Dacca District.
(3) Balaghat, in the Central Provinces.

In these cases lice were excluded.

Cases of similar fever in which ticks were strongly suspected to be the vectors, though they were not actually found biting, occurred in the following districts:—

Saugor, Jubbulpore, Nagpur, Pachmari in the Central Provinces, Rutlam in Central India; Kistna, Chittoor, Trichinopoly, and Bellary in Madras Province; Bangalore in Mysore; Dharwar in Bombay; Angul in the Orissa Feudatory State; Akyab in Burma; Secunderabad in Hyderabad.

Lice could be excluded in nearly all the above cases with a considerable degree of certainty. The Weil Felix reaction was negative in 31 cases in which it was tested.

In three cases agglutination occurred in a dilution of 1|80 and in four cases in a dilution of 1|20. The Kasauli strain of *proteus* X19 was used in nearly all cases. There was no evidence of person to person infection.

RELAPSING FEVER.

This disease is now known to have a much wider distribution in India than was suspected a few years ago. It is likely that the disease occurs in some districts in which it is reported to be unknown. The remarkable freedom of Bengal, Assam and Burma, and the rarity of the disease in Bihar and Orissa are striking features. In the report of the Public Health Commissioner with the Government of India for 1924, it is stated that 4,034 deaths occurred in Bengal from relapsing fever. There is no authentic record of the disease in Bengal, except in Darjeeling and one or two subordinate districts. It is likely that the reporting agents in Bengal have included relapsing malaria under the heading "relapsing fever." The plains of Bengal appear to be quite free from the disease. The season of greatest prevalence is from November to April.

The mortality is estimated by some civil surgeons at as low a figure as 2 to 3 per cent., by others as high as 60 per cent. The average mortality for the whole of India is about 22 per cent.

It must be noted that relapsing fever tends to occur in great epidemic waves and so the distribution varies greatly from year to year. The plains areas of Madras are now reported to be practically free from the disease.

SANDFLY FEVER.

It will be seen from the maps that sandfly fever is a disease chiefly of the north-west and centre of India.

Madras, Orissa, Bengal and Assam report no cases, while Bombay, Bihar and Burma report cases from only one district in each province.

DENGUE.

This has a much wider distribution than that shown in the map, and one is sceptical about the reported complete absence of the disease from many districts in Bengal, Assam and Burma. The disease almost certainly occurs all over Bengal and over the greater portions of Assam, Madras, Bihar and Orissa and the United Provinces.

Dengue is exceedingly likely to be overlooked when it occurs in sporadic form in a partially protected indigenous population, so that while the positive records may be accepted as being fairly trustworthy, the negative reports cannot be admitted as reliable evidence of the absence of the disease.

The relationship between sandfly fever and dengue has been a difficult problem; it was hoped that the combined experience of the civil surgeons of India would throw some light on this point, but the replies for the most part are vague.

DIPHTHERIA.

This is reported as being common in 17 districts, rare in 129, and unknown in 37.

There is no striking difference in the general trend of the replies received from the various provinces. The districts in which the disease is reported to be common are as follows:—

Bengal:—Burdwan, Dacca, Dinajpur, Bogra and Mymensingh.

Bihar and Orissa:—Singhbhum, Manbhum, Santal Parganas.

Bombay:—Karachi, Bombay, Nasik.

Central Provinces:—Narsingpur, Jubbulpore.

The disease appears to be rather less common in Madras, Assam and Burma than in the other Provinces, but the distribution of the disease on the whole appears to be fairly uniform. In Calcutta it is known to be very common.

Enlarged tonsils and adenoids appear to be common all over India; only a few districts report that the disease is rare.

Rheumatic endocarditis.—The summary of the replies from all over India shows that the disease is said to be common in 18 districts, rare in 149, and unknown in 32.

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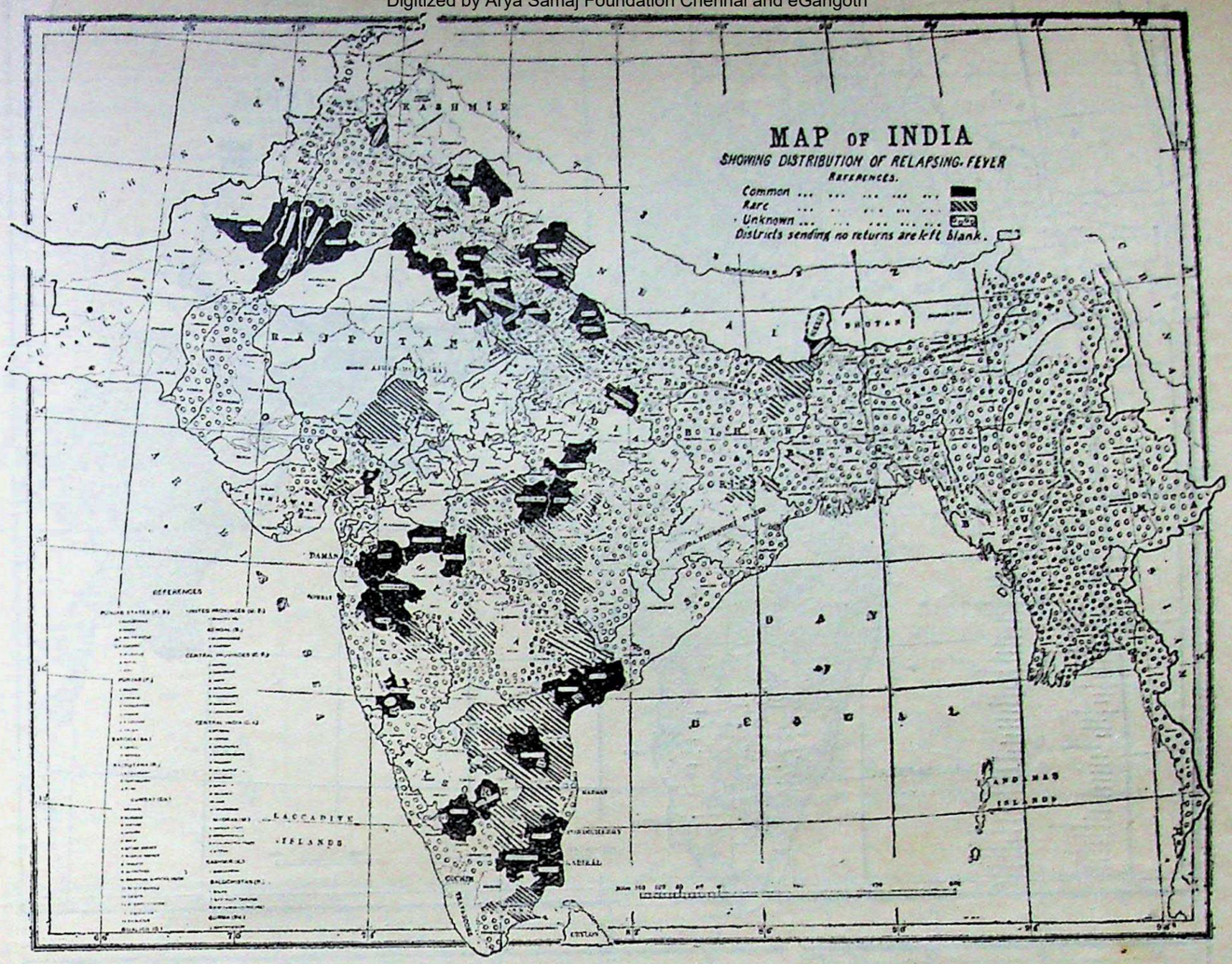

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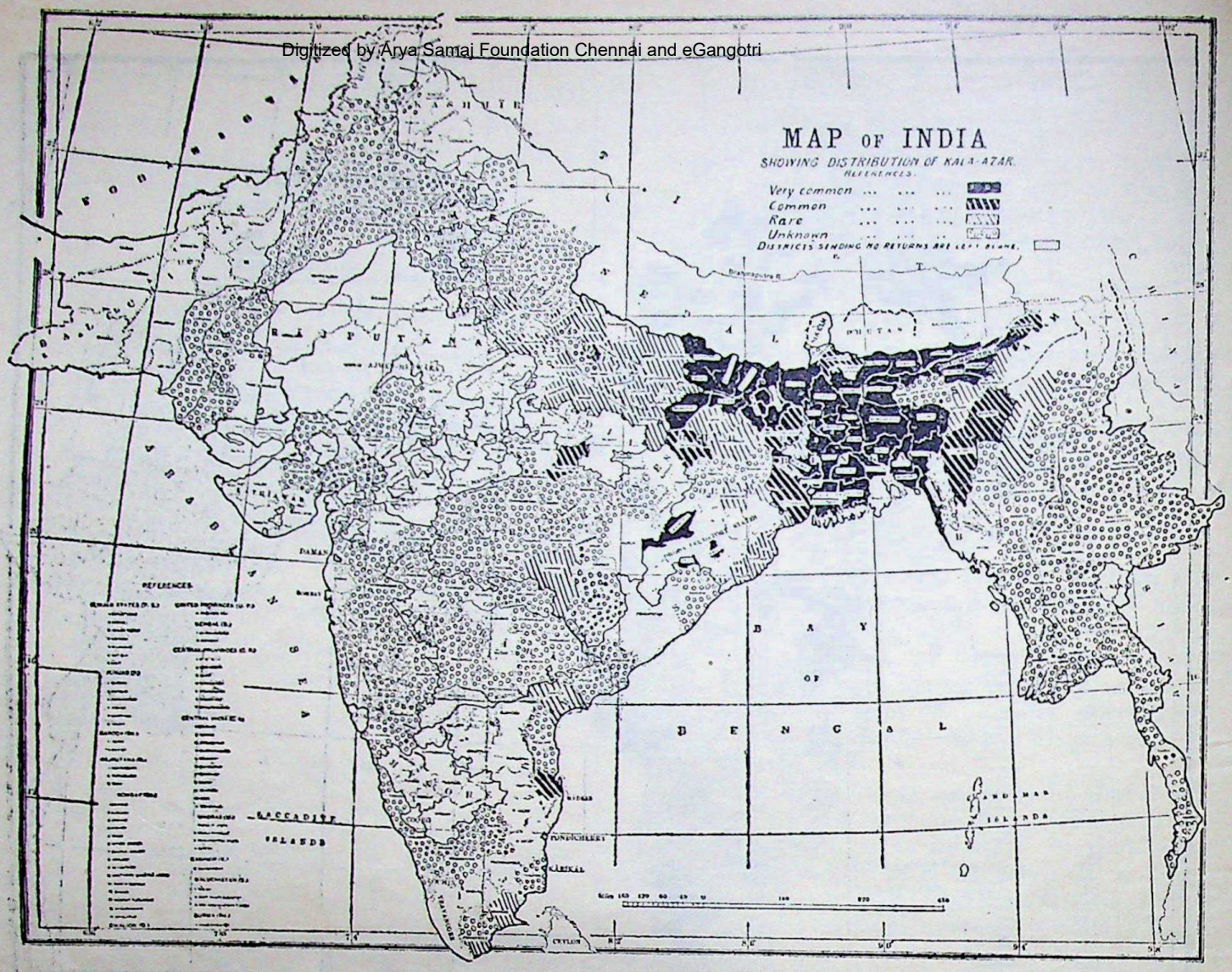

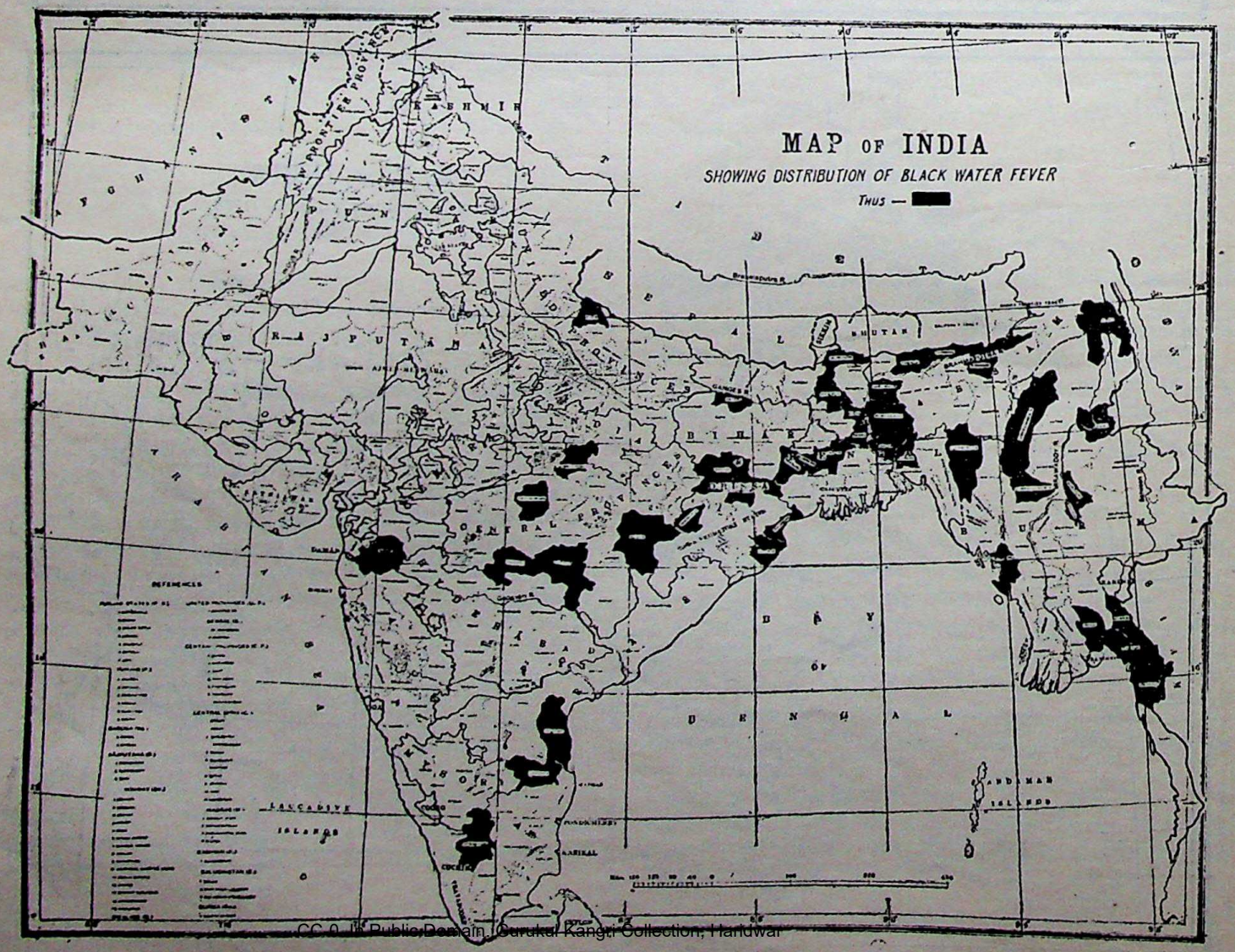

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The distribution of the replies according to Provinces is:—

	Bengal.	Assam.	Burma.	B. & O.	Madras.	U. P.	Punjab.	N. W. F.	Bombay.	C. P.
Common ..	4	1	2	1	4	2	2	0	0	2
Rare ..	12	8	15	19	16	30	13	4	20	22
Unknown ..	4	3	8	0	1	5	3	0	4	4

The disease appears to be widely but sparsely distributed over India.

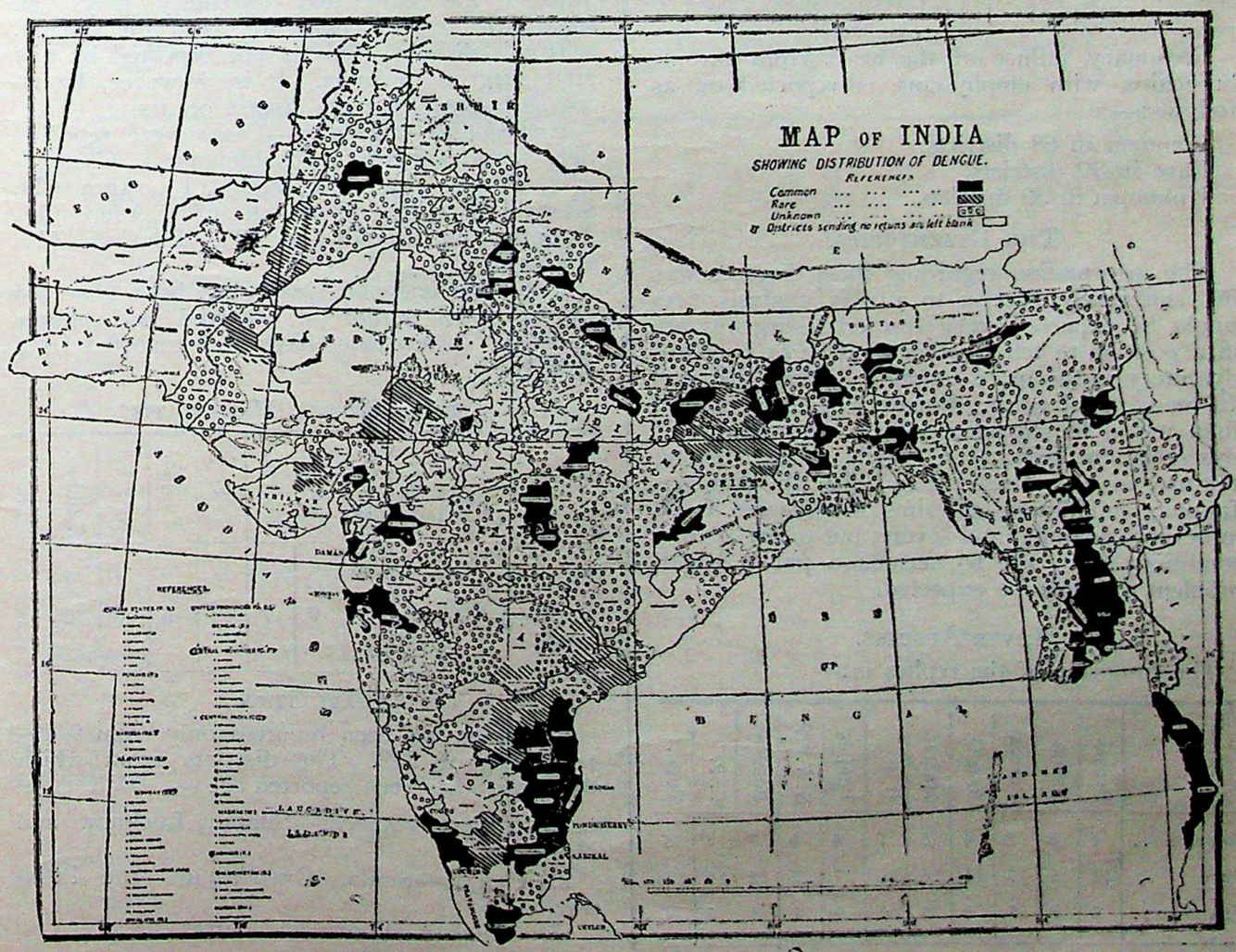
SOME SYPHILITIC MANIFESTATIONS.

	Common in.	*Rare in..*	*Unknown in.*
Aortic valve disease.	23 districts	119 districts	70 districts
Aneurysm ..	8 ,,	107 ,,	97 ,,
Syphilitic paraplegia.	58 ,,	111 ,,	43 ,,
G. P. I. ..	4 ,,	76 ,,	132 ,,
Locomotor Ataxy.	12 ,,	102 ,,	98 ,,

Syphilitic paraplegia and aortic valve disease are the only late neuritic or vascular manifestations of syphilis which are considered to be common by any considerable number of medical men in India. From personal experience, one is sure that these two diseases are quite common in most places in India, Aneurysm is not uncommon, but locomotor ataxy and general paralysis of the insane are far less common in India than in most European countries. The distribution of the syphilitic diseases according to Provinces is not given, as there is no evidence that any Province is specially affected.

Tuberculosis of the lungs.—This is reputed to be common in 176 districts, rare in 36, and unknown in none. The disease is undoubtedly very common all over India, especially in the larger centres of population. So far as can be judged by the returns, the disease seems to be less common in Burma than elsewhere, as 10 out of 26 districts report the disease to be rare.

Abdominal tuberculosis is reported to be uncommon in 19 out of 20 districts in Bengal, in 10 out of 12 in Assam, in 21 out of 26 in Burma, in 16 out of 18 in Bihar, in 13 out of 15 in the Central Provinces, while it appears to be more prevalent in the United Provinces where



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it is reported as being common in 15 out of 34 districts; also in the Punjab, where it is common in 17 out of 21. Gland, bone and joint tuberculosis are fairly uniformly distributed throughout India.

The summary of the replies is:—

	Common in.	*Rare in.*	*Unknown.*
Pulmonary tuberculosis.	176 districts	36 districts	0 districts
Abdominal tuberculosis.	65 ,,	110 ,,	17 ,,
Gland tuberculosis.	140 ,,	48 ,,	4 ,,
Bone and joint tuberculosis.	92 ,,	88 ,,	12 ,,

Chronic bronchitis with emphysema.—This is a common disease all over India. The summary of the report is:—

	Bengal.	Assam.	Burma.	B & O.	Madras	U. P.	Punjab.	N.W.F.P.	Bombay.	C. P.
Common ..	10	6	12	12	8	35	17	4	7	12
Rare ..	10	2	11	7	14	7	3	0	6	4

Secondary failure of the heart from chronic bronchitis with emphysema is reported on as follows:—

Common in 68 districts.
Rare in 99 districts.
Unknown in 30 districts.

THE DYSENTERIES.

The information regarding these diseases was not sufficiently precise to justify analysis. As might be expected, very few civil surgeons are in a position to tell whether amœbic or bacillary dysentery is the more common in their districts. In many rural areas, dysentery is less common than would be expected, indeed the mildness of dysentery in India as a whole is a striking feature of the disease. In jails, in times of famine, and among pilgrims the disease tends to be very common and severe, but under normal conditions it is not so serious a public health problem as might be expected.

LIVER ABSCESS.

The summary of the replies is:—

	Bengal.	Assam.	Burma.	B. & O.	Madras.	U. P.	Punjab.	N.W.F.P.	Bombay.	C. P.	Total.
Common ..	4	0	3	4	5	7	4	0	7	2	36
Rare ..	14	5	17	14	16	26	17	3	12	10	134
Unknown ..	2	7	7	0	0	1	0	1	3	3	24

ASCITES.

An attempt was made to find out whether the post-dysenteric ascites described by the senior author has been recognised by civil surgeons. A question was asked "Have you enquired as to a history of dysentery occurring shortly before the onset?" This question was not very happily worded and the replies were not so satisfactory as could be desired.

	Bengal.	Assam.	Burma.	B. & O.	Madras.	U. P.	Punjab.	N.W.F.P.	Bombay.	C. P.	Total.
History of dysentery shortly before onset.	11	3	5	12	4	29	8	1	10.	8	91
No recent history of dysentery	10	2	7	4	8	4	8	3	11	7	64

The large number of positive replies from the United Provinces and Bihar is probably due to the fact that greater attention was paid by the civil surgeons of these provinces to the part played by dysentery than was the case in the other provinces. The evidence taken as a whole favours the view that dysentery plays an important part in connection with the disease.

Weil's disease.—This is not reported by any civil surgeon in India. It is, however, by no means unlikely that the disease occurs.

Encephalitis lethargica.—Cases were reported only from: Cuttack (probable cases), Champaran, Saran (1), Hoshiarpur (1), Agra (2), Karachi (6), E. Khandesh (3), Aden (1), Nagpur (1), Chindwara (2), Bilaspur (1), Lucknow (1).

Only one undoubted case has been observed by the senior author; it occurred in Lucknow in 1919. A few cases have been reported from Calcutta.

CEREBRO-SPINAL MENINGITIS.

	Bengal.	Assam.	Burma.	B. & O.	Madras.	U. P.	Punjab.	N.W.F.P.	Bombay.	C. P.
Reported.	5	4	2	5	2	7	9	1	3	5
Not observed.	11	3	7	7	7	12	6	3	6	5

SCARLATINA.

Scarlatina has been reported only from 9 districts out of 212. The districts from which the disease has been reported are:—

1. *United Provinces*—Sitapur, Lucknow and Mussoorie.
2. *Punjab*—Simla, Gurudaspur and Peshwar.
3. *Bombay*—Poona and Surat.

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4. *Central Provinces*—Jubbulpore.

No cases are reported from any other district in India.

Nearly all the cases were amongst Europeans; two civil surgeons give a history of infection being conveyed through letters received from places in England where cases of scarlatina were occurring.

STONE.

This is a fairly common disease throughout India. All provinces appear to be equally affected.

The summary of the replies is:—

Common in 103; rare in 86; unknown in 5 districts.

CATARACT.

There is no evidence that any province is affected more than the others.

The summary is; common in 153 districts, rare in 41 districts.

CANCER.

General impressions regarding cancer are notoriously fallacious and the figures which are given in the table cannot be regarded as accurate. They do however indicate in a general manner some features of cancer incidence in India. The disease is common in India as a whole; cancer of the breast, uterus and mouth being reported as of frequent occurrence by a large proportion of the civil surgeons. It is difficult to believe that the disease is unknown in certain localities; probably the civil surgeons of the districts do not happen to have met with cases. Cancer of the stomach would appear to be much less common than cancer of the other organs which are commonly affected: only 8 civil surgeons report that the disease is common, whereas no less than 117 report that the disease is rare. Of the 8 districts in which cancer of the stomach is reported to be common, no less than 4 belong to Madras. In reply to the question "Have you seen any cases of cancer of the stomach verified at autopsy?" only 8 civil surgeons replied in the affirmative. All the others replied that they had never seen such cases. This constitutes rather strong evidence that cancer of the stomach is much less common in India than in European countries.

There is a very strong impression amongst the civil surgeons that cancer of the mouth is associated with the habit of betel chewing: 65 reported an association between the betel chewing habit and cancer of the mouth; 17 reported tobacco chewing as a factor in causing the disease; while 14 reported that they had not observed any association between the betel or tobacco chewing habit and cancer; and 96 did not reply to the query.

The summary of the report is:—

CANCER IN INDIA.

Name of provinces.		Bengal.	Assam.	Burma.	B. & O.	Madras.	U. P	Punjab.	N. W. F. P.	Bombay.	Central Provinces.	Hyderabad.	Total.
Number of districts	..	20	12	26	18	21	34	21	4	21	15	10	202
Breast.	Common	5	1	18	7	8	25	9	2	12	5	6	98
	Rare	12	6	4	11	12	5	12	2	9	10	3	86
	Unknown	3	5	4	0	0	4	0	0	0	0	1	17
Uterus.	Common	4	3	6	5	11	17	5	2	5	0	0	58
	Rare	13	4	16	13	10	7	16	2	16	12	5	114
	Unknown	3	5	4	0	0	10	0	0	0	3	5	30
Stomach.	Common	0	0	1	0	4	1	0	1	0	1	1	9
	Rare	10	4	6	7	8	7	6	3	12	4	0	67
	Unknown	10	8	19	11	9	26	15	0	9	10	9	126
Mouth.	Common	1	2	4	6	15	9	12	2	10	1	1	63
	Rare	17	8	6	12	6	16	9	2	9	6	5	96
	Unknown	2	2	16	0	0	9	0	0	2	8	4	43
Skin.	Common	2	3	3	6	4	9	1	2	3	0	2	35
	Rare	16	9	7	12	17	18	12	2	14	7	2	116
	Unknown	2	0	16	0	0	7	8	0	4	8	6	51

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ENDEMIC GOITRE.

The map shows the distribution of this disease. It is most common in the districts which lie immediately south of the Himalayas and in the hilly regions of Assam and Burma. The distribution suggests that the agency which causes the disease is carried down by the streams arising in the Himalayas and other mountains and is spread by the water which overflows from these rivers in the rainy season.

The distribution favours an agency of a chemical nature rather than a bacterial infection. The geographical distribution, which appears to remain constant over long periods of time, is not such as would be expected if the disease were due to intestinal infection.

OSTEOMALACIA.

The information which has been obtained is shown in the map. The disease is fairly common in many parts of Bombay, the Punjab, the United Provinces and the Central Provinces; it appears to be very rare in Bengal, Madras, Burma, and Bihar and Orissa.

RICKETS.

This disease is much more cosmopolitan than osteomalacia; its distribution is shown by the following table.

	Bengal.	Assam	Burma.	B & O.	Madras.	U. P.	Punjab.	Bombay.	C. P.	Total.
Common	2	0	3	5	6	7	1	10	7	41
Rare ..	4	2	4	1	2	3	3	2	3	24
Unknown	10	4	4	7	4	10	6	1	2	48

It will be seen that the disease is more common in Bombay, the Central Provinces and Madras than in the other provinces. Bengal, Assam, and the Punjab appear to be relatively free from the disease.

SCURVY.

The only provinces in which this is at all common are Bombay and the United Provinces. The summary of the replies is shown in tabular form in the next column.

	Bengal.	Assam.	B. & O.	Madras.	U. P.	Punjab.	Bombay.	C P
Common ..	—	1	2	—	4	—	4	2
Rare .	1	5	1	2	7	3	7	10
Unknown ..	—	5	10	—	9	7	9	2

LATHYRISM.

The map shows the remarkable distribution of this disease.

Except for Jhelum in the Punjab, Meerut, Shahjahanpur and Unad in the United Provinces, the disease occurs only in a belt which runs across the Central Provinces, the east of the United Provinces, and the north of Bihar.

The manner of onset is stated by 14 civil surgeons as gradual and only 1 has reported the onset as sudden: 12 civil surgeons reported that the disease was caused by eating *khesari dal* and 7 that *teora dal* was the cause.

PELLAGRA.

This disease is reported as being unknown to all the reporting civil surgeons, except that from Lyallpur 4 doubtful cases were reported. There is one well-authenticated case which was reported by Colonel Calvert, I.M.S., in the Calcutta Medical College. Colonel Sandes reports one possible case at Natore.

FILARIAL DISEASE.

The map shows the distribution in so far as it is known to the medical officers of the districts. The positive reports can be accepted without question, but in many of the districts in which the disease is reported to be rare or even unknown the information is known to be inaccurate. For example in the 24 Parganas the disease is reported to be unknown, whereas a large number of indigenous cases have been seen by us in Calcutta.

Our knowledge of the distribution of filarial disease in India is exceedingly meagre.

It was hoped that useful information would be obtained from the replies to the question, "What percentage of the prisoners in the jail show elephantiasis of the limbs or scrotum?"

Replies were received from 19 civil surgeons.

	Bengal.	Assam.	B. & O.	Madras	Bombay.
Number of replies ...	7	2	4	5	1
Negative	5	1	1	3	..
Positive	2	1	3	2	1
Names of positive districts and percentage.	Bankura 2·6 percent. Murshidabad 1 per cent.	Darrang 1 per cent.	Cuttack 1·5 per cent. Puri 11 per cent. Santhal Parganas 84 lock up daily—6	Tanjore 1 per cent. Kanara 1 per cent.	Bijapur 0·4 per cent.

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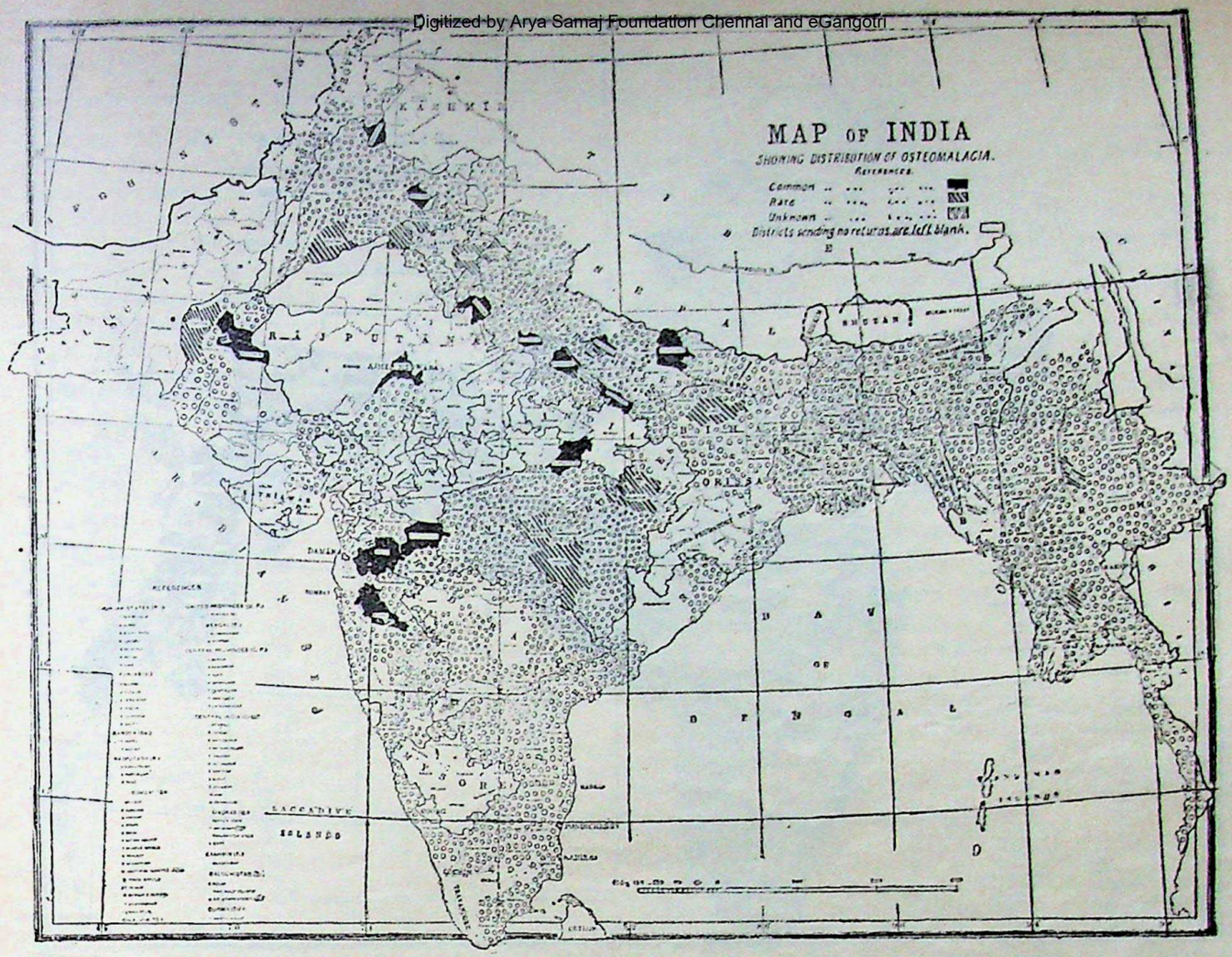

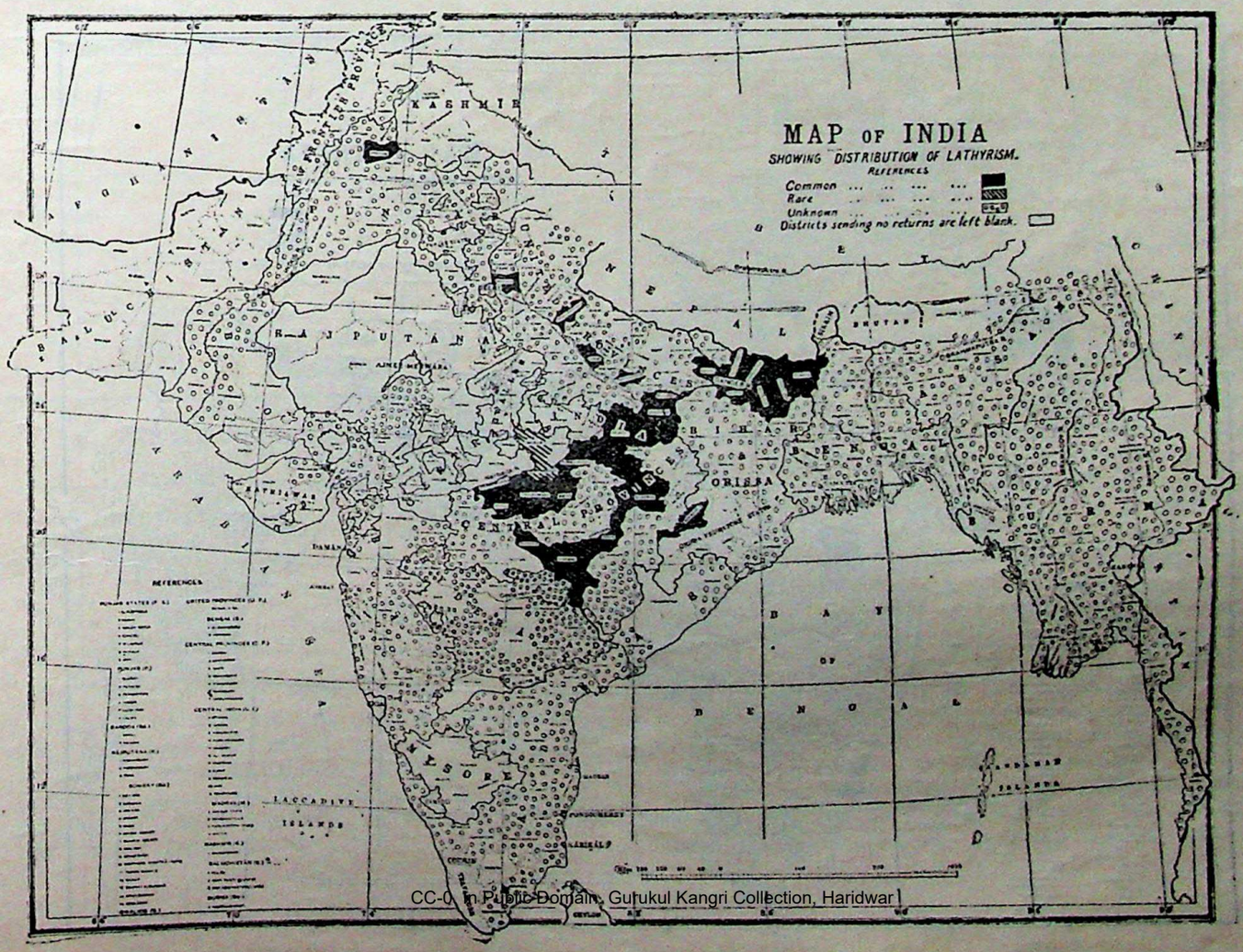

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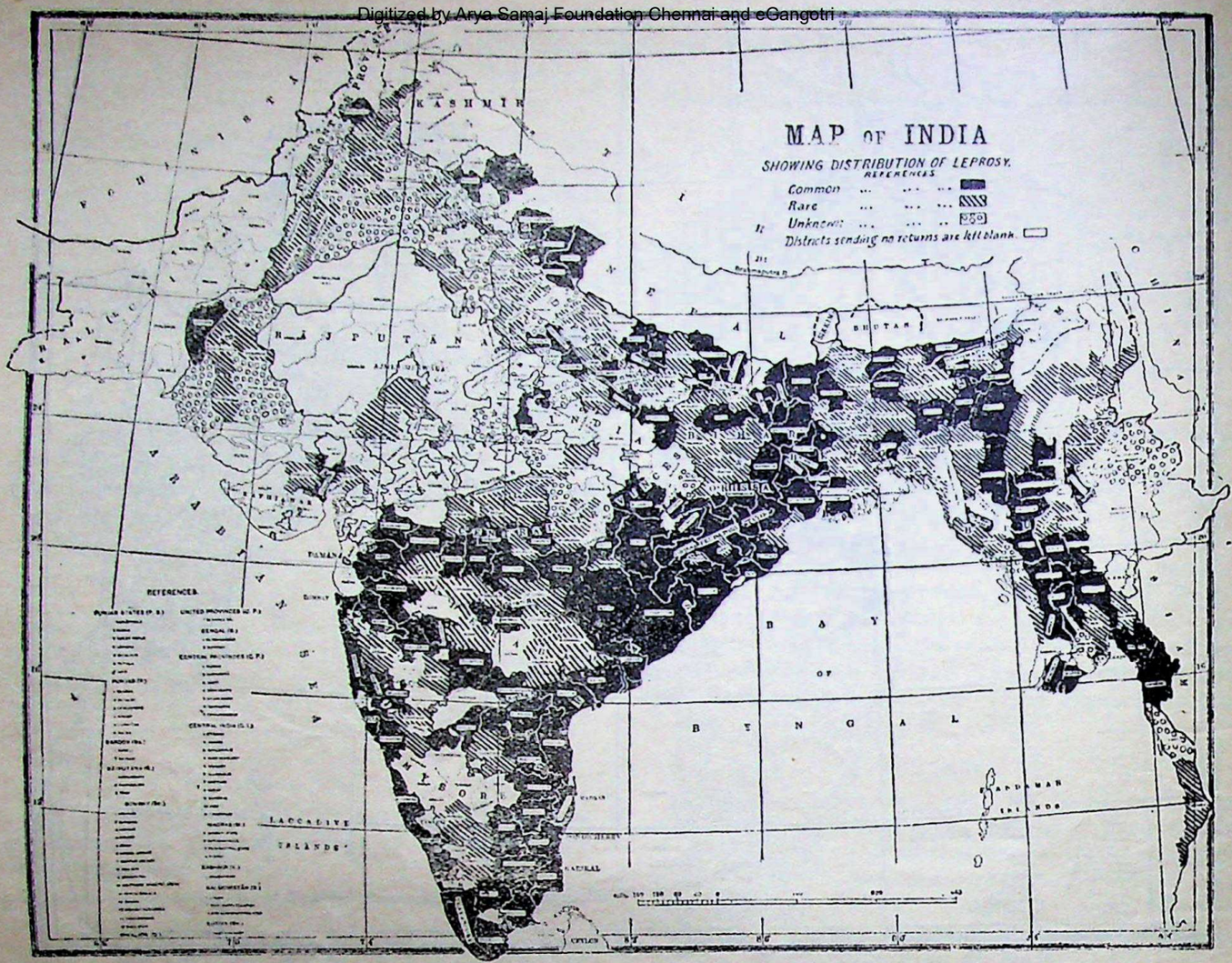

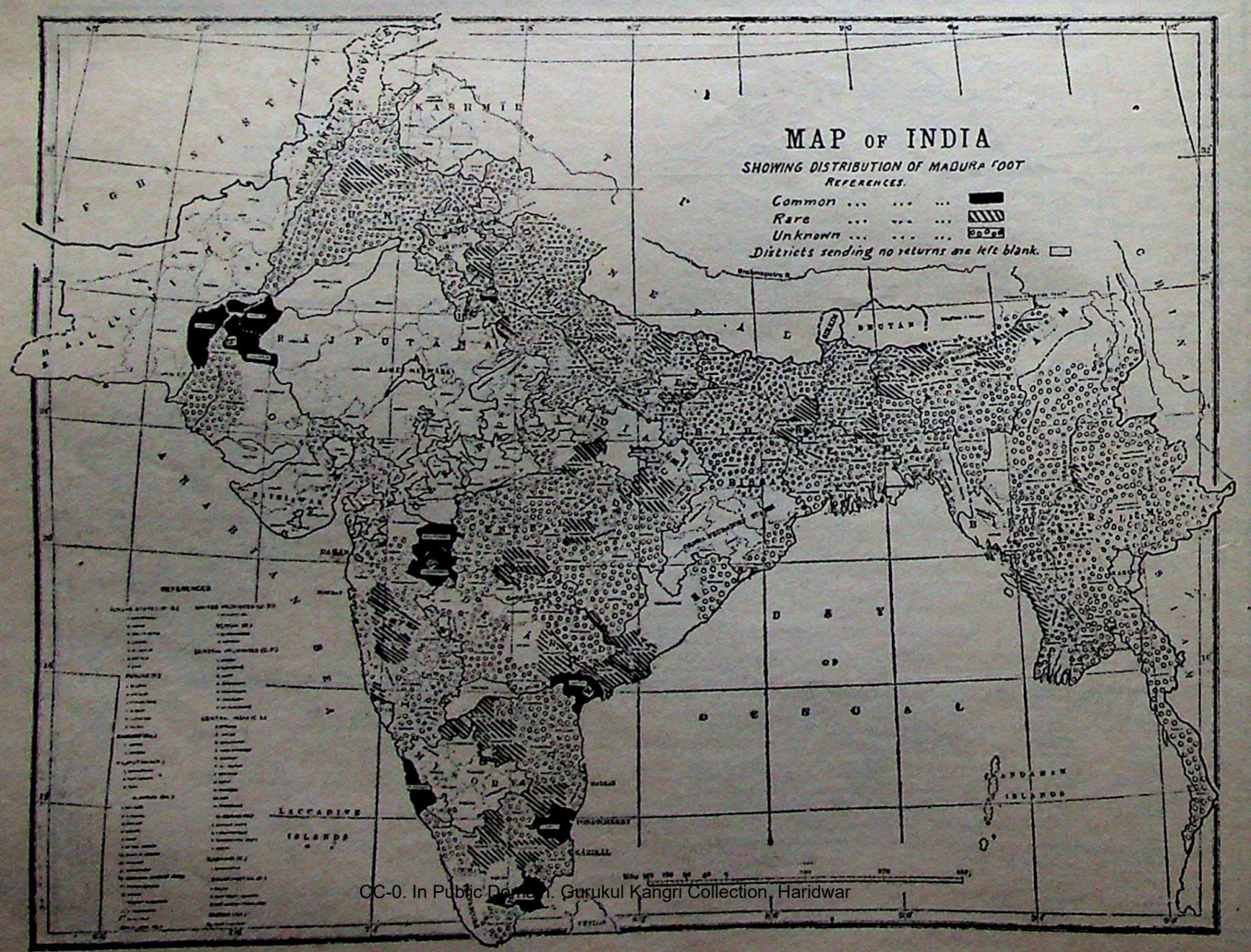

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Judging by the large number of patients treated at the Hospital of the Calcutta School of Tropical Medicine, the disease in Bengal is much more common than the replies suggest.

Dr. Sundara Rao supplies the following figures which show the incidence of filarial infection in certain localities as determined by his personal investigation.

1921–1926.	Filariasis Survey.		
	Number examined.	Number positive.	Approximate Percentage.
Bengal.			
Calcutta ..	217	21	10
Howrah ..	50	5	10
Hooghly ..	60	7	12
Midnapore ..			
Midnapur ..	150	24	16
Kharagpur ..	240	9	4
Narangarh ..	34	7	21
Bankura ..	50	7	14
Burdwan ..	50	4	8
Pabna ..	35	2	6
Dinajpur ..	100	13	13
Bihar and Orissa.			
Cuttack—			
Total ..	2,000	240	12
Jail ..	492	125	25
Balasore ..	40	3	7
Purulia ..	60	8	13
Ranchi ..	90	0	0
Hazaribagh ..	63	0	0
Gaya ..	93	14	15
Madras.			
Ganjam ..	35	3	9
Vizagapatam ..	81	10	12
Kristna ..	30	2	6
Godavari ..	150	15	10
Guntur ..	54	1	2
Nellore ..	32	1	3
Madras ..	61	6	10
United Provinces.			
Almora ..	64	0	0
Bhowali ..	36	0	0
Bhimtal ..	10	0	0
Central Provinces.			
Saugor ..	50	0	0

Blood smears taken at night were also received from the following places:—

Madras.	Number examined.	Number positive.	Percentage.
North Arcot (Vellore) ..	25	0	0
South (Mangalore) ..	79	1	1.2
Kristna (Narsapur) ..	8	1	12.5

GUINEA-WORM DISEASE.

The distribution of this disease as shown by the map may be relied on as being pretty accurate, except that some districts where the disease is shown as rare are possibly not really affected. This is the case in the report from the United Provinces.

The disease is one which is easily recognised and the reports of the civil surgeons taken as a whole make a convincing picture.

Dr. Asa C. Chandler has made some modifications of this map in the light of a more detailed questionnaire which he issued. He doubts whether any cases occur in the United Provinces.

MADURA FOOT.

This disease has a wider distribution than was suspected; it is reported to be common in Madras in S. Kanara, Ramnad, S. Arcot and Guntur; in Bombay, in Aden, E. Khandesh, Sukkur, Larkana and Khairpur; also in Delhi.

CLIMATIC BUBO.

This is only reported from Cawnpur and Hamirpur in the U. P. and from S. Kamrup and Ramnad in Madras.

A group of cases was seen by the senior author in British soldiers in Calcutta about 17 years ago. The bacteriological examinations gave negative results both in cultures and on animal inoculations. The disease had been suspected to be an outbreak of pestis minor.

LEPROSY.

The distribution of the disease in India is universal, but in a good many districts it is reported to be rare. No district in the Punjab reports the disease to be common, whereas in Bombay and Burma all the reports indicate that it is common.

	Bengal.	Assam.	Burma.	B. & O.	Madras.	U. P.	Punjab.	Bombay.	C. P.	Total.
Common	7	5	8	11	16	12	6	10	3	78
Rare ..	4	3	0	4	2	9	4	0	4	30

An attempt was made to arrive at some idea of the frequency of the disease by asking the civil surgeons to report the percentage incidence of the disease among the prisoners under their charge. Replies were received from 39 civil surgeons and the average incidence worked out at 0.92 per cent. for the prisoners, but as no reports were received from the Punjab where the disease is rare the figures have to be corrected, and it is likely that 0.75 per cent. would represent a more accurate figure for the prisoners.

The jail population does not fairly represent the whole community; it is difficult to form an opinion as to whether lepers would be more or less likely to find their way into prison than other people; apart from this consideration the prison population is drawn for the most part from the adult males, as infants and children are not represented to any appreciable extent.

So far as the figures go, they would suggest an incidence of the disease of about 2 or 3 per mille for all India. It is likely on the other

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hand that many of the mild and early cases are overlooked, so that any estimate which is based on such figures as these must be regarded as guess work, but they are probably as near the truth as any existing figures and they would indicate that there are from a half to one million lepers in India and Burma.

Disseminated sclerosis.—This disease is reported from the following places:—

(1) Bengal—nil.

(2) Assam—nil.

(3) Burma—Tharrawady, Mandalay and Tyangya.

(4) B. & O.—Saran.

(5) Madras—Godavari, S. Kanara and Anantpur.

(6) U. P.—Sitapur, Lucknow, Benares, Partabgarh, Meerut, Ferrakabad, Cawnpur, Allahabad and Agra.

(7) Punjab—Karnal, Rohtak, Gurgaon, Amritsar, Jhelum, Shahpur and Ferozepur.

(8) C. P.—Cambay, Surat and Sovantbati.

The medical officers who report that they have seen cases state that Hindu and Muhammedan males have been affected. No cases were reported in females, but it must be remembered that a disease of this kind would be unlikely to come to the notice of the civil surgeons if it occurred in a female.

EXOPHTHALMIC GOITRE.

The distribution of the disease seems to be a "chance one." Young adult females are said to be most commonly affected. Out of 35 reporting civil surgeons young males are mentioned by only 2 civil surgeons, the remainder all report having seen the disease in females.

Acute Anterior poliomyelitis.—This is only reported from Benares, Shahranpur, Furrakabad, Allahabad, Mirzapur, Bunda and Agra. The disease is by no means so rare as these records would suggest. A good many cases have been seen by the senior author in Calcutta.

SPRUE IN INDIANS.

To the question "Have you seen any cases of sprue among Indians?" only 10 civil surgeons reported that they had seen such cases. These were the civil surgeons of Gorakhpur, Furrakabad, Ludhiana, Dera-Ismail Khan, Ahmedabad, Broach, Surat, Sovantbati, Sholapur and Kolaba.

The disease obviously is rare in Indians as compared with Europeans.

HYDATID CYST.

Cases of hydatid cyst have been seen by 42 civil surgeons; of these 22 specify that the disease occurred in the liver, the others do not specify the organ of the body which was affected.

The disease appears to be widely but sparsely distributed all over India as is seen from the table.

	Bengal.	Assam.	Burma.	B. & O.	Madras.	U. P.	Punjab.	Bombay.	C. P.
Reported as observed.	2	nil.	7	1	6	9	11	5	5
Reported as not observed.	7	6	13	10	6	6	4	11	0

LUPUS VULGARIS.

This disease is reported from 166 districts, but only 4 civil surgeons report cases in which the diagnosis was established by laboratory examination.

The disease would appear to be uncommon in most parts of India, except the Punjab and the United Provinces. From personal experience, one is satisfied that the disease is even less common than would be suggested by the table. Almost all the cases which the senior author has seen in which the clinical diagnosis of lupus vulgaris was made, turned out to be seborrhœic dermatitis or other disease.

	Bengal.	Assam.	Burma.	B. & O.	Madras.	U. P.	Punjab.	Bombay.	C. P.	Total.
Reported as observed.	6	2	3	4	3	11	9	5	5	48
Not reported.	10	8	25	17	20	34	20	25	19	178

YAWS.

The distribution is best appreciated by a glance at the map. It is quite likely that the disease may have a wider distribution than that shown, as there is a general tendency to regard cases of yaws as being syphilitic.

On the whole, however, the map gives as good an impression of the distribution as can be expected at the present time.

SKIN DISEASES.

Lieutenant-Colonel H. W. Acton, I.M.S., has kindly supplied the following information with regard to skin diseases.

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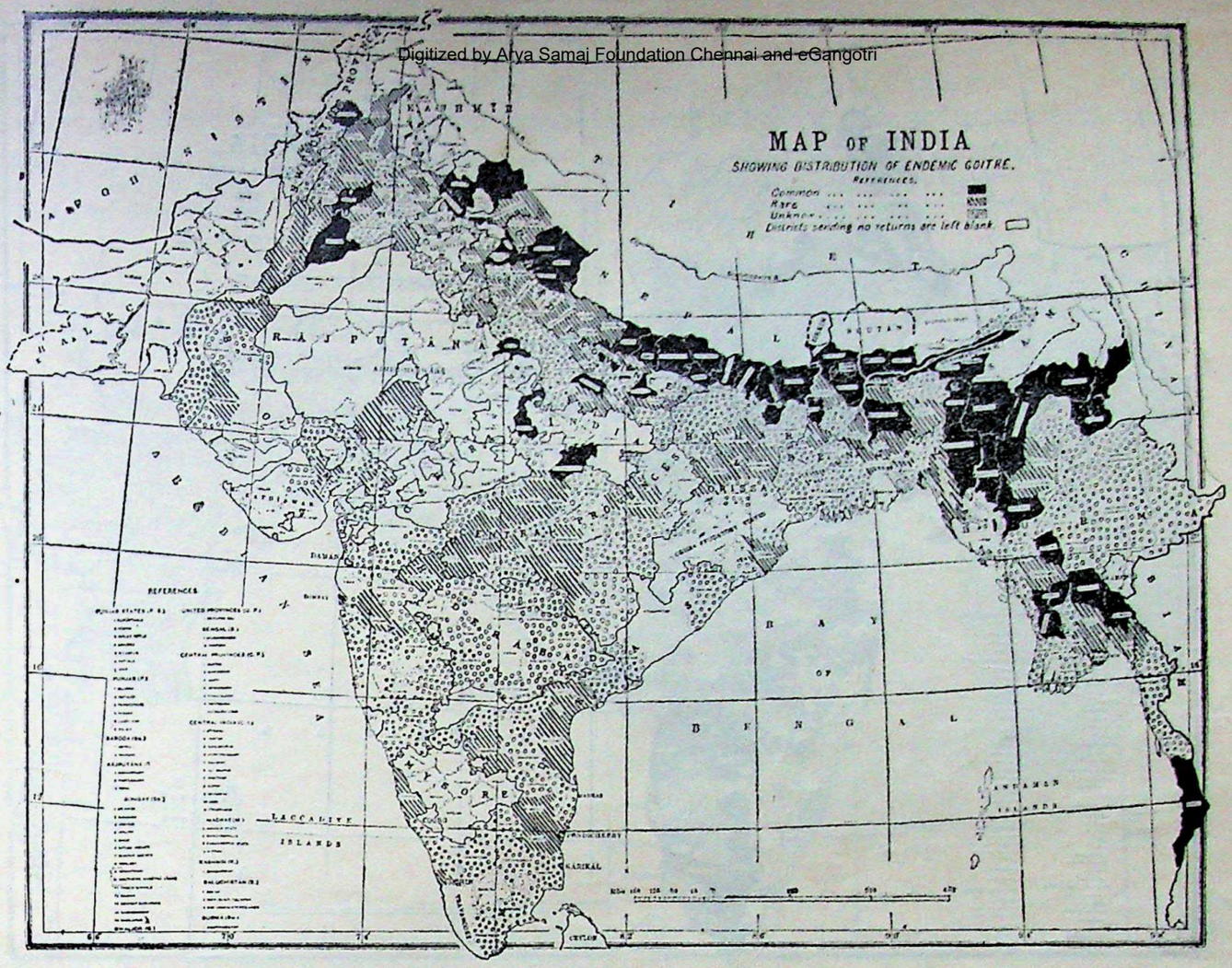

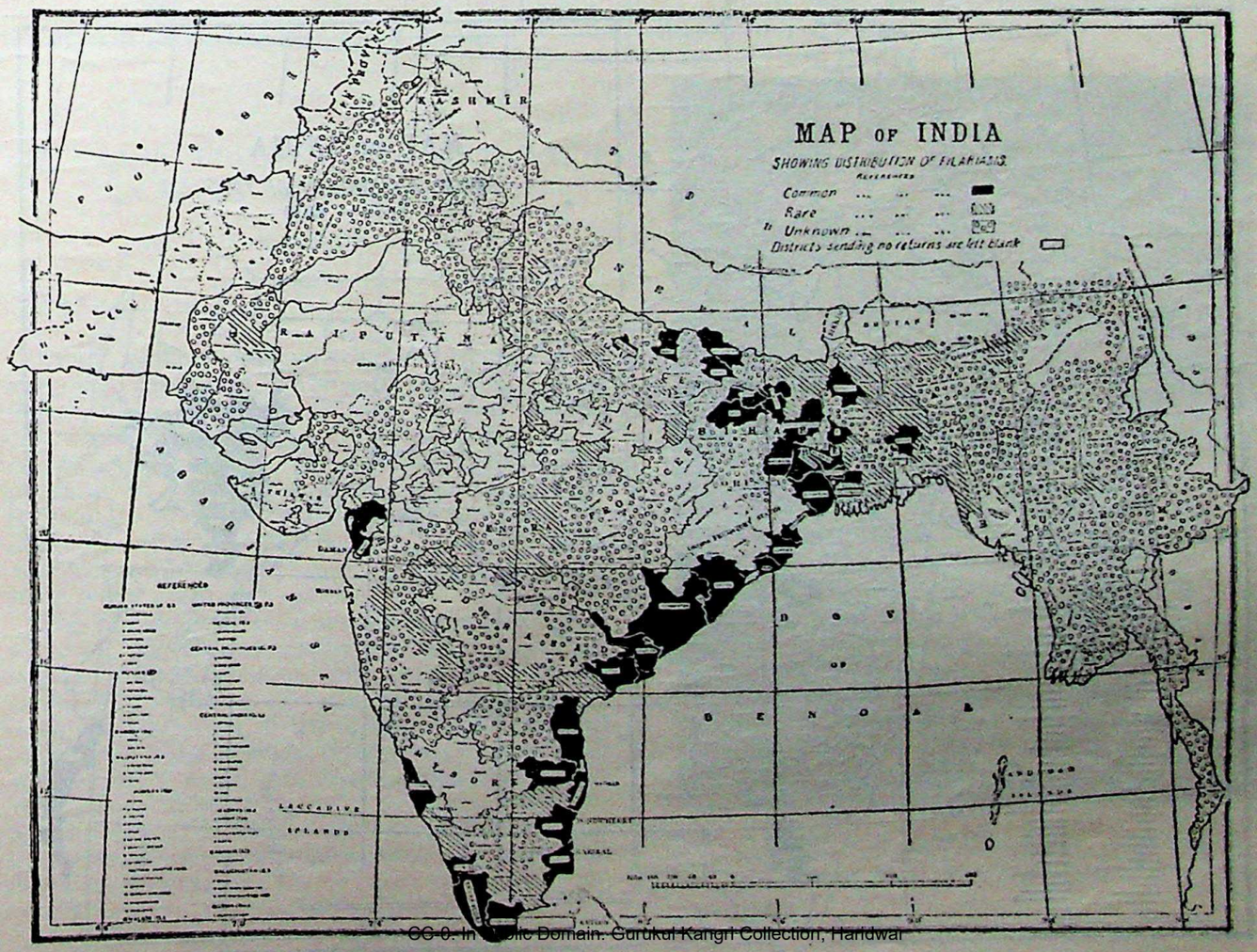

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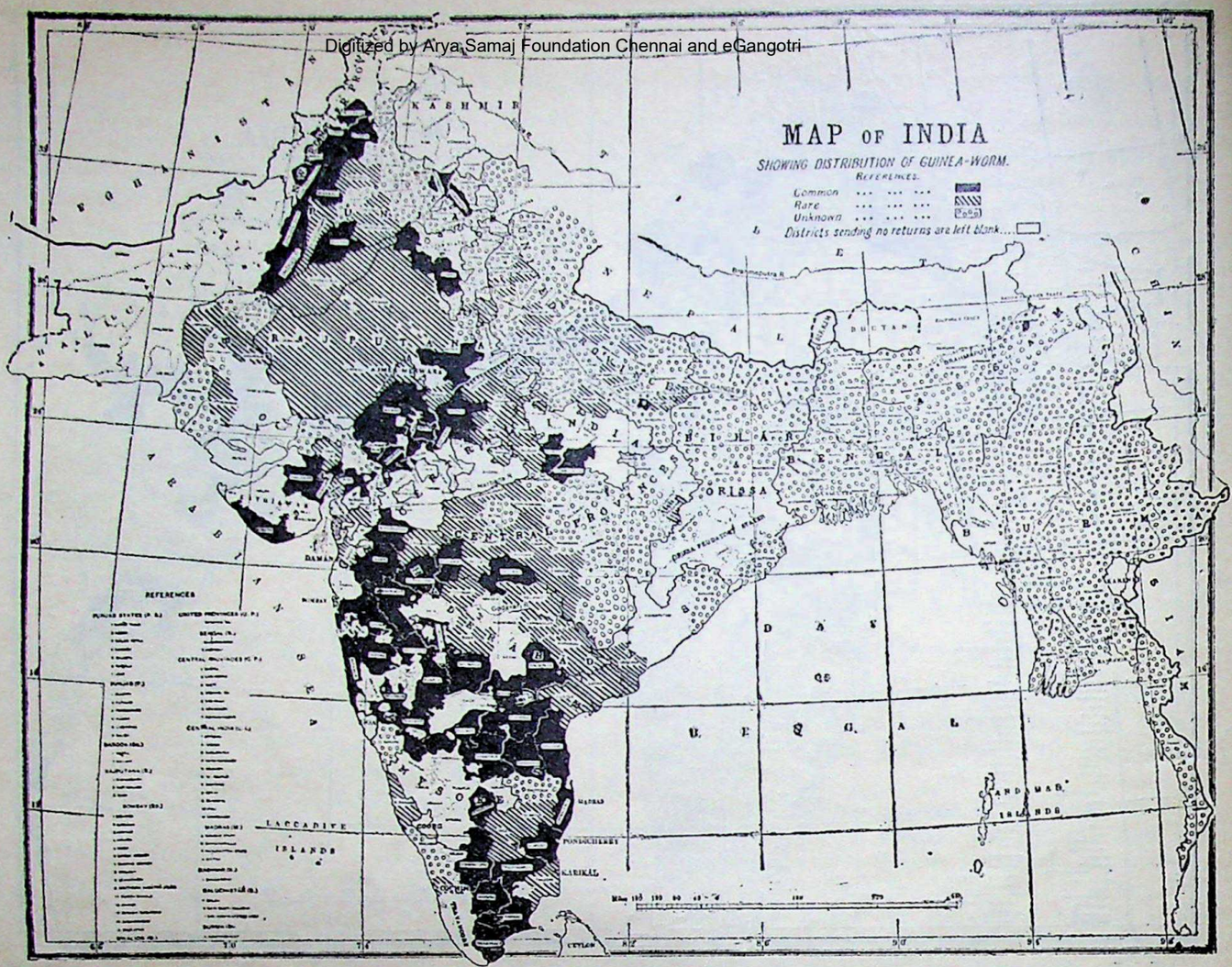

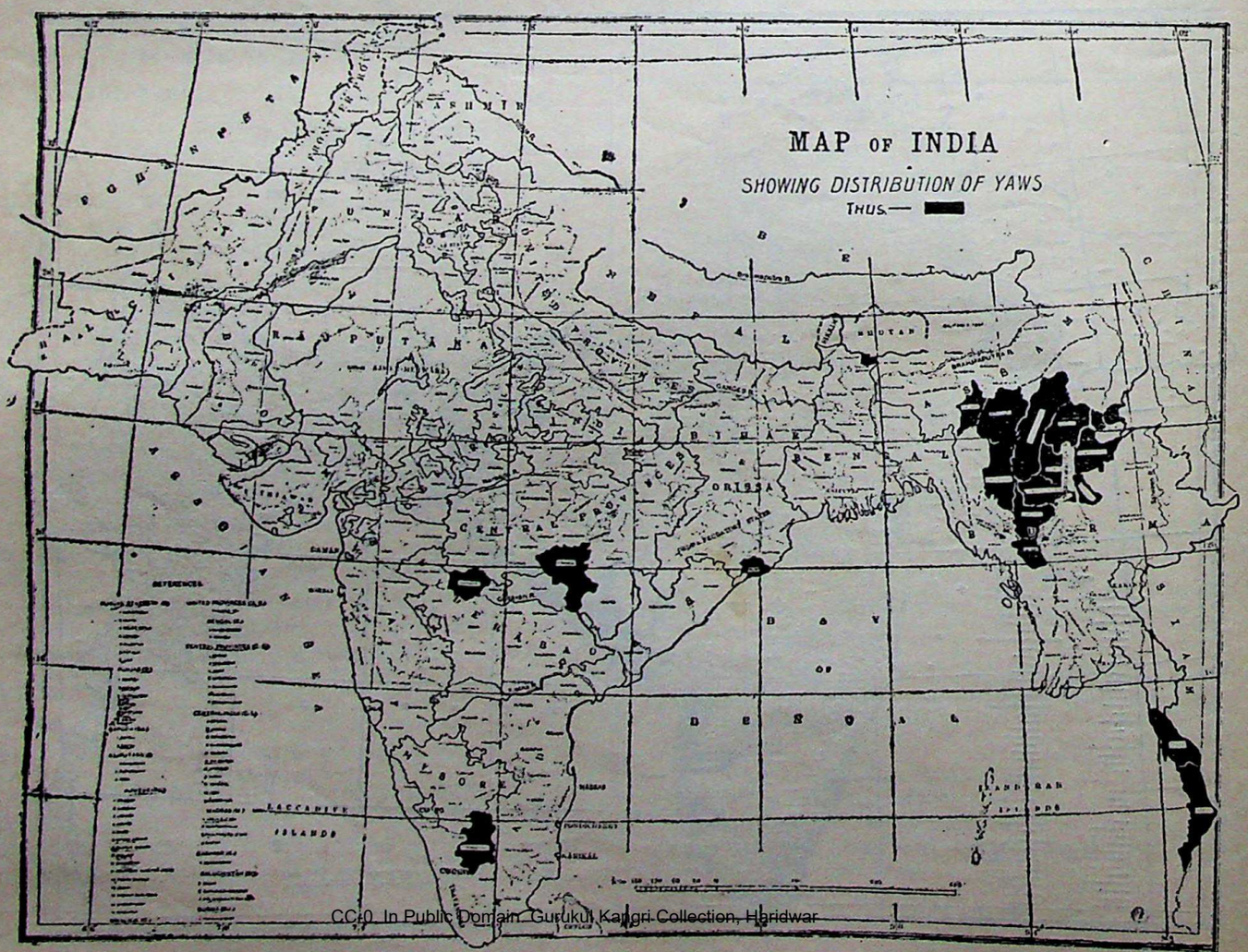

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Number of cases of common skin diseases seen in the outdoor clinic of the Calcutta School of Tropical Medicine.

	1926.			
Tinea	707	Erythrodermia	12	2 1
Leprosy	328	Acne rosacea	9	
Pigmentary defects—		Furunculosis	19	
Leucoderma	245	Dermal Leishmaniasis	19	
Chloasma	48	Lupus vulgaris	11	18
Streptococcal dermatitis	198	Tuberculidæ	7	
Seborrhœic dermatitis	187	Lupus erythematosus	15	
Scabies	164	Von Recklinghausen's disease	II	
Thyroid defects—		Warts, papillomata	II	
Scleroderma	44			
Lichen	42			
Ichthyosis	32			
Keratosis follicularis	11			
Morphœa	3			
Keloids	3	Total number of all cases	2,484	
P. R. pilaris	1			
Syphilis	75			
Psoriasis	50			
Granulomas and chronic ulcers, undiagnosed	50			
Acne vulgaris	27			
Urticaria	24			
Alopecia areata	22			

A good deal of positive information has been obtained by this collective survey, but the chief impression that is conveyed is of the need for a more accurate disease survey of India.

SPUR-LIKE PROJECTIONS MET WITH IN BONE RADIOGRAPHY.

By J. H. BARRET, D.M.R.E.,

CAPTAIN, I.M.S.,

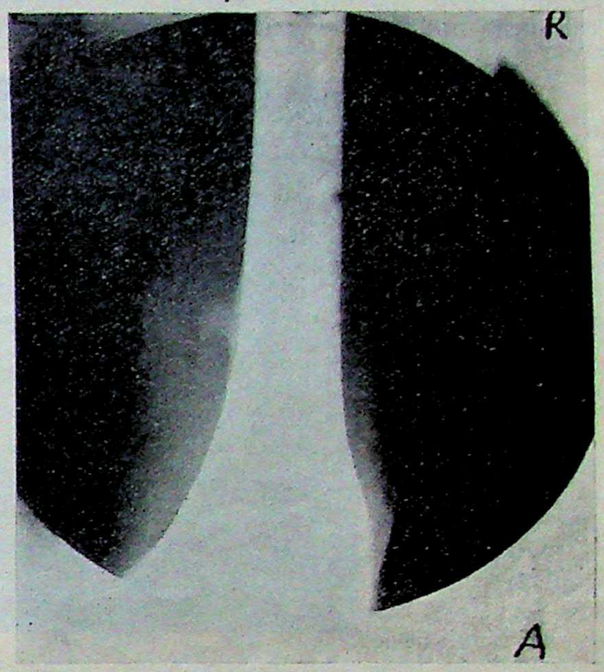
Quetta.

MOST medical men will have noticed that in practice, cases of a particular group come before them like geese from a *jheel* in batches of two, three, or four. This peculiarity is not confined to the fevers, which in itself is sufficient to make it remarkable. A house-surgeon in a general hospital will tell you that on Monday he admitted three "skull-fractures," on Tuesday, four "gastric ulcers," and on Wednesday perhaps "five lunatics."

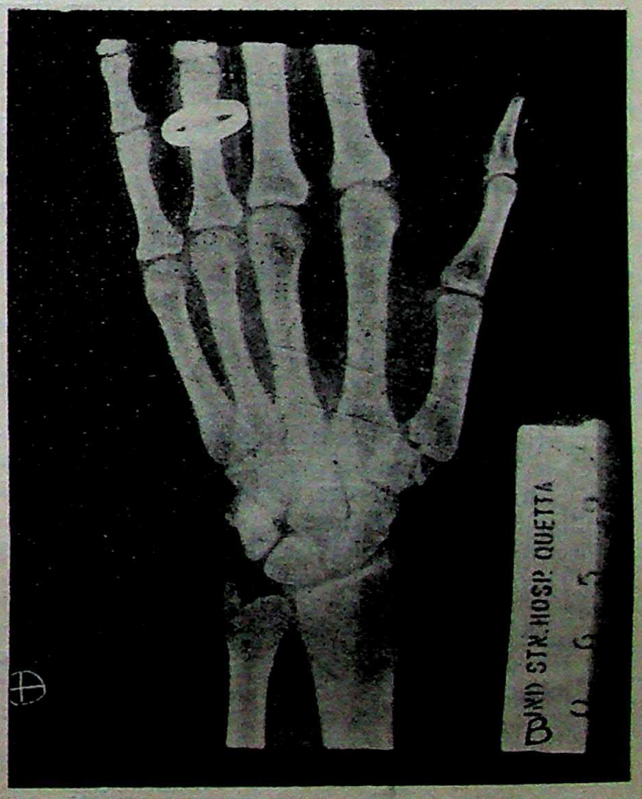
The radiologist has a similar experience. On a recent morning I examined four "sprained ankles." Each had a spur on the astragalus due to an injury which had occurred years before.

In the literature I have been unable to find little more than a brief reference to these bone spurs, and I hope this short article and chart will enable others to discover the commoner spurs, and to visualize the more readily the sites where they occur, and where to look for them in skiagrams.

Three photographs are submitted. They are sufficient to illustrate the importance of a careful *x*-ray examination in suspected cases.



Photograph "A."—This shows the "parrot's beak" spur on the left humerus of a medical man. Before radiographic examination he had for several years considered the symptoms to be due to fibrosis in the muscles.



Photograph "B."—This shows a "needle-spur" projecting from the trapezium of a young

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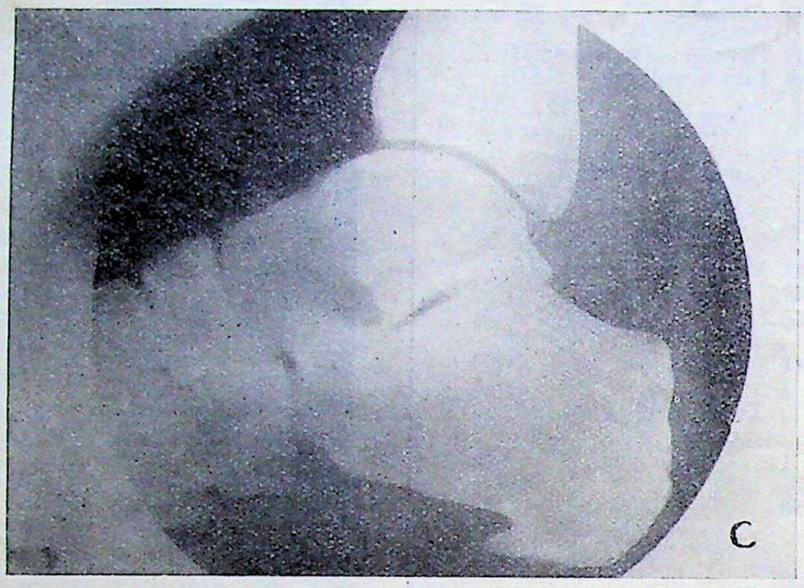
lady. There was a history of a fall from her bicycle six weeks previous to *x*-ray examination. A foreign body in the hand was suspected.

Photograph "C."—This shows the common "calcanean spur." Its existence was suspected previous to the taking of the skiagram. There was pain, tenderness and swelling in the plantar aspect of the heel. The patient could scarcely put his foot to the ground and he was quite incapable of carrying on his work.



Spur-like projections met with in bone radiography.—These spurs are easily distinguished from bone tumours, the main points being their site of origin, the spear-head or hook-like shape, the fairly constant relation to tendons or ligaments, and the frequent absence of marked symptoms.

Significance.—Although symptoms are rarely marked and practically never serious, it behoves us to keep in mind the commoner sites where such projections occur, and by using the *x*-ray method of diagnosis we are often enabled to clear up certain obscure cases where diagnosis was only a matter of conjecture.

Symptoms, when symptoms are present.—The symptoms depend on the site; for instance in the well-known parrot's beak spur, which occurs on the internal supracondyloid ridge of the humerus, the patient usually complains of pain on pressure or on flexion of wrist and elbow joints. The painful heel of the infantry-man is a more familiar example. There is pain, tenderness, inability to put the foot on the ground, swelling may be present and the symptoms may be aggravated if the spur has been fractured. Again we have the adductor-spur of the bushranger and the cavalryman. They complain of pain on the inner aspect of the thigh, aggravated when gripping the saddle, and they can always put their finger on the exact lump.

Sequela.—A spur may be fractured.

Classification.—Bone spurs are either congenital or traumatic. Beatjer (Professor of Radiology, Johns Hopkins University) describes a heel spur due to gonorrhœa, so that we recognize (*a*) congenital, (*b*) traumatic, and (*c*) infective. In the table below an attempt has been made to show the ordinary bone spurs that one is likely to come across in radiographic work.

Congenital bone spurs.

Name.	Site	Symptoms.	REMARKS.
1. Occipital ..	Occipital protuberance	rare	....
2. Styloid ..	Styloid process of temporal bone (stylohyoid) ligament.	rare	....
3. Internal supracondyloid.	Internal supracondyloid ridge of humerus.	yes	Considered homologous to the supracondyloid foramen of birds.
	Traumatic spurs		
1. Heel spur..	Plantar ligament.	yes	....
2. Scaphoid spur.	Upper aspect of tarsal scaphoid.	yes	Often accompanied by astragalo-scaphoid arthritis.
3. Astragalus spur.	Astragalus ..	yes	Ditto
4. Olecranon spur.	Insertion of triceps.	yes	....
5. Patellar spur	Insertion of patellar ligament.	yes	....
6. Tendo-Achilles.	Attachment of tendo-Achillis to os calcis.	yes	....
7. Adductor spur (adductor longus.)	At its insertion in linea aspera.	yes	Have seen one case where a spur occurred at its origin from the body of the pubis.
	Infective spurs		
Infective heel-spur.	Plantar bursa.	yes	Distinguished from the traumatic by hazy appearance and absence of structure similar to bone, not a true spur.

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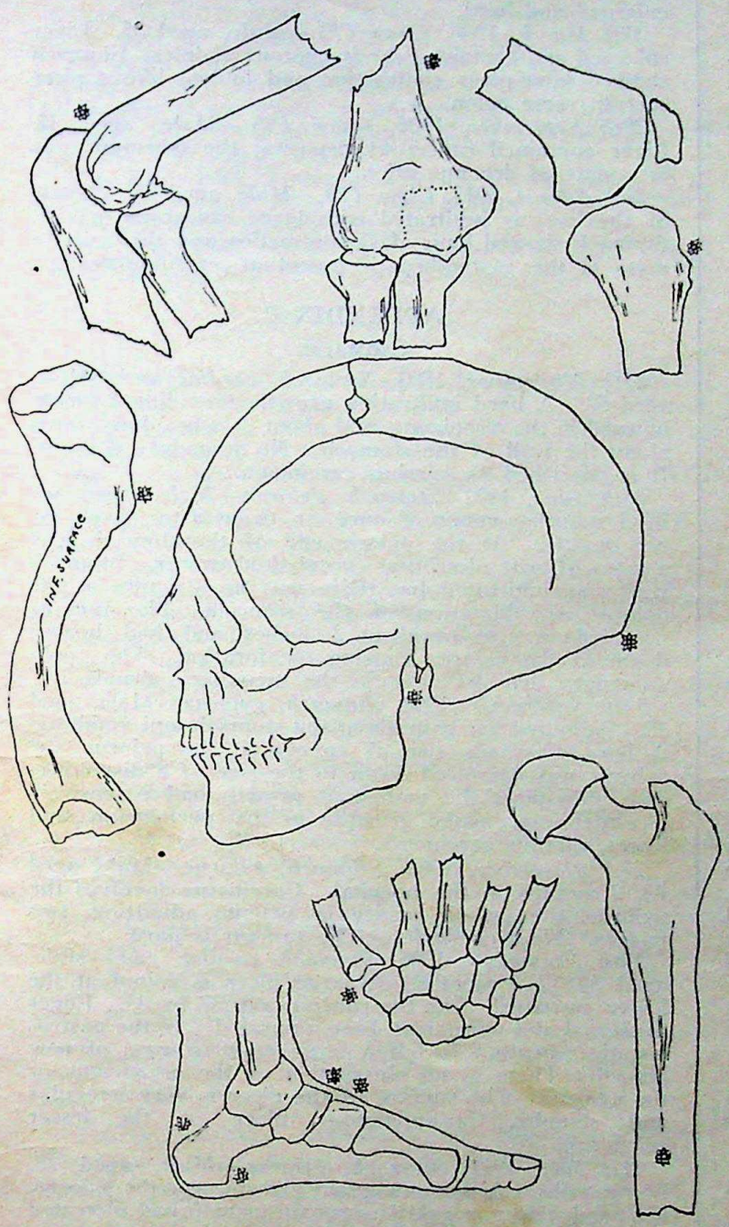
Other spurs sometimes met with occur in (*a*) the bodies of the vertebræ, (*b*) the trapezium, (*c*) the under surface of the clavicle (conoid lgt.), (*d*) body of the scapula, (*e*) base of the terminal phalanx of the great toe. Spurs may occur in association with fractures.



Treatment of bone spurs.—If the symptoms are sufficiently severe to warrant interference, surgical removal will be the usual treatment. An incision is made over the spur and the offending spike is chipped off with a bone forceps and the wound closed with a few stitches of silk-worm gut. If sepsis is anticipated, due to an inflammatory condition of the tissues round the spur, it is better to apply B. I. P. P. and to leave a few threads of silk-worm gut at one end of the wound to act as a drain. These will be removed after a few days and a simple dressing applied.

THE INCIDENCE OF PRIMARY CARCINOMA IN INDIA AS INFERRED FROM *POST-MORTEM* RECORDS OF FIFTY YEARS FROM 1877 TO 1926.*

By P. V. GHARPURE, M.B.,

Department of Pathology, Grant Medical College, Bombay.

WHILE going over the records available in the pathological department of this College and while remounting the specimens in the pathological museum, I was interested in a large number of similar wet specimens and their descriptions. These roused my curiosity to collect and compare the notes available, both clinical and those obtained at autopsy. I believe that such a study may be to some extent instructive. I managed to collect such primary carcinoma cases as were available with their notes and microscopical findings.

The subject I have selected to-day is the consideration of carcinoma as it affects four organs wherein it is often a matter of doubt or difficulty to decide its nature, whether primary or secondary. My investigation relates to primary carcinoma of the liver, stomach, pancreas, and gall-bladder. The rarity of this affection in the four organs under consideration may well be judged from the fact that only 36 cases have been recorded in a collection of six thousand odd during the last fifty years.

Out of the 36 cases, in 14 the liver was described as the seat of primary malignant disease. On careful study of the notes and microscopical sections I find that in only two cases is this conclusion beyond doubt—*vide* Appendix A—and in all the others there is enough evidence to suspect a primary focus elsewhere. To illustrate such evidence, take the case wherein, in a female aged 55 or a male aged 72, the liver is described as being enormously large and the seat of multiple carcinomatous nodules without any reference to the condition of the genitals, uterus in the female. and prostate in the male. Such cases evidently cannot be taken as cases of primary carcinoma of the liver. The two cases beyond any doubt have exhaustive notes—one of which is a very recent one examined by myself—and present very definite characters, viz., the organ itself has undergone little, if any, change in size; it is in a marked multilobular cirrhotic condition and the tumour is a very rapidly growing one; this is in support of the theory that carcinoma of the liver is an end result of multilobular cirrhosis. It is met with in comparatively young adults.

Of the 13 cases of carcinoma of the stomach, in 8 the pylorus was affected, in 2 the cardiac end, in 3 the body over a large area. The commonest type is the scirrhus, being found in 9 cases, the soft variety in 2, and a carcinomatous ulcer in 2. It is met with from ages between 30 to

* A paper read before the Bombay Branch of the British Medical Association, with demonstration of gross and microscopical preparations.

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65, and more often in young adults. In only one case was the whole of the stomach described as being very thick and deformed; in two instances it is described as being hour-glass shaped where the carcinoma is in the middle of the organ. It is noteworthy that all these cases are in the male (*vide* Appendix B).

Regarding carcinoma of the pancreas, there are 7 cases on record and in all these there have been secondary deposits in the liver, mesenteric glands, and peritoneum. Unfortunately neither the gross specimens nor the microscopic sections of any of these are available. Out of these, 3 had been put down in the records under carcinoma of the liver for no reason. I have put these under the heading pancreas, on the strength of the notes themselves. In all cases the site of malignant disease is the head of the pancreas (*vide* Appendix C).

Lastly, carcinoma affecting the gall-bladder at its neck is still more rare, only 2 cases being recorded, one in a male aged 70 and the other in a female aged 40; in both there were secondary deposits in the liver and omentum; one of these was also recorded as primary carcinoma of the liver, (*vide* Appendix D). In only one—the former—did the gall-bladder contain calculi.

APPENDIX A.

"PRIMARY" CARCINOMA OF THE LIVER, 14 CASES.

23rd June, 1926, *Liver*.—Female, aged 50, ill 2 months. Multilobular cirrhosis and adeno-carcinoma. Liver smaller than normal; on the top of the right lobe was a hard nodule of the size of an orange. On the under surface were seen small vessels packed with malignant tissue. The under surface showed an excellent example of permeation by blood vessels. On the cut surface the tumour was noticed to fill the branches of the portal vein and was protruding out through the porta hepatica. Microscopic section:—adeno-carcinoma of the liver.

17th November, 1923, *Liver*.—Female, aged 55, ill for one year, bulging in the epigastrium and deep jaundice. Liver enlarged and adherent; surface hard and nodular.

29th June, 1912, *Liver*.—Male, aged 40, ill 1½ months. Deeply bile stained body and organs. Liver closely adherent to the diaphragm, pale in colour, surface irregular and nodular; the cut surface shows abundant new growths and very little normal tissue. The growth showed softening at many places. Weight, 3,600 grammes.

1st June, 1910, *Liver*.—Male, aged 30, ill 12 days. Free fluid in the abdominal cavity and the tissues stained yellow. Liver large and full of white masses; recently fixed to the diaphragm. The liver is deformed and the tumour is comparable to brain substance. Weight, 3,600 grammes.

17th November, 1908, *Liver*.—Male, aged 39. Abdominal enlargement six months and more rapid enlargement two months before death. History of alcohol and evidence of syphilis. Liver large and cirrhotic, numerous yellowish looking growths seen on the surface. Secondaries in the lung.

24th September, 1903, *Liver*.—Male, aged 45, ill 3 months. Liver enlarged to more than three times its normal size, and full of yellowish-grey nodules which are soft.

4th October, 1903, *Liver*.—Male, aged 50, ill 3 months. Blood stained fluid in the peritoneal cavity. Liver three times its normal size and nodular.

1st September, 1899, *Liver*.—Male, aged 72, ill 3 months. Liver 2,650 grammes, enormous size, multiple growths in its substance.

10th February, 1894, *Liver*.—Male, aged 55, ill 3 months. Liver 2,660 grammes, consisted of mass of cancerous tissue with very little liver tissue. Secondaries in the abdominal glands.

9th August, 1887, *Liver* (?).—Female, aged 60, ill 3 years. Liver contained large number of growths scattered throughout its substance.

1st May, 1916, *Liver* (?).—Male, aged 40, ill 6 months. Liver enlarged and full of malignant deposits. Pancreas enlarged and hard.

31st March, 1906, *Liver* (?).—Male, aged 55. Liver enlarged and contained carcinomatous nodules. Stomach showed hour-glass contraction and looked like a piece of transverse colon.

29th September, 1906, *Liver* (?).—Male, aged 35. Liver contained cancerous deposits; the omentum was in a state of decomposition.

2nd August, 1915, *Liver* (?).—Male, aged 28. Whole of the liver is infiltrated with large cancerous masses. Stomach showed hour-glass contraction and there was a mass in the gastro-hepatic omentum, carcinomatous.

APPENDIX B.

STOMACH.

25th November, 1893, *Stomach, cardiac end*.—Male, aged 60. A hard infiltrating growth extending 2 inches upward in the œsophagus and about 2 inches downwards along the wall of the stomach. No secondary deposits. It is described as scirrhus carcinoma.

25th June, 1893, *Stomach, pylorus*.—Male, aged 60, ill 4 months, vomiting once or twice after food for six months. At the pyloric end of the stomach was a mass of soft ulcerating encephaloid cancer. Stomach wall was infiltrated but there was no stricture at the pylorus nor dilatation of the stomach. The tumour occupied an area of about 2 inches and had broken down in the centre, causing perforation. The only secondary deposits were in the mesenteric glands.

13th September, 1894, *Stomach, pylorus*.—Male, aged 35. Admitted for pain about the stomach and vomiting. A hard mass the size of an egg at the pylorus, the pylorus was narrowed down to the size of a dissecting-case blow-pipe, the malignant growth had extensively ulcerated; secondary growths in the peritoneum and liver; scirrhus carcinoma.

27th December, 1902, *Stomach, pylorus*.—Male, aged 42, 2 months in the hospital. Carcinoma involves the pylorus, the pyloric orifice is patent admitting two fingers. No secondaries. The tumour is hard.

14th November, 1905, *Stomach, cardiac end*.—Male, aged 30, ill 3 months. A large ulcer is found at the lesser curvature near the cardiac end, 3″ by 4″. Edges thickened and prominent, base indurated. In the gastro-hepatic omentum is felt a large nodular mass of new growth. There is no obstruction of the œsophagus or the pylorus. The surface of the ulcer is very irregular and sloughy. Carcinomatous ulcer on the lesser curvature.

21st July, 1911, *Stomach, pylorus*.—Male, aged 38, ill 2 months. A soft malignant growth near the pylorus, not producing any pyloric stenosis, growth had ulcerated on its inner surface. Soft variety.

16th October, 1912, *Stomach, body*.—Male, aged 45, 2 months in hospital. Stomach very much enlarged, about 3″ from the pylorus there is a constriction of the organ dividing it into two saccules, larger cardiac and smaller pyloric. The constriction admits 3 fingers. At the lesser margin of the stomach near the cardiac end there is a considerable area of irregular ulceration; wall of the stomach in this region is considerably thickened and moderately hard. Secondaries in the mesenteric glands and spinal column.

22nd September, 1912, *Stomach, pylorus*.—Male, aged 50. Malignant disease involved an area 3″ in diameter near the pylorus. Encephaloid cancer. No secondaries.

16th July, 1913, *Stomach, pylorus, body*.—Male, aged 65, ill for 3 months. One-fourth of the stomach on the side of the pylorus feels hard. The pylorus itself unaffected, the disease affecting the wall of the stomach, more advanced along the lesser curvature.

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Secondaries in the liver, omentum, and mesenteric glands.

5*th February*, 1916, *Stomach, body*.—Male, aged 50. The fundus in the second half of the stomach is infiltrated with a very hard malignant growth—scirrhus cancer. The growth reached up to about an inch from the pylorus, which itself is healthy. Patient admitted for complaint of emaciation 4 months before admission and vomiting every day, six to seven hours after food. A hard moveable lump in the epigastric region was felt which was not painful.

5*th July*, 1917, *Stomach, pylorus*.—Male, aged 40. Stomach small, scirrhus cancer at the pylorus. Ulcer of the size of one rupee on the lower surface. Patient admitted for pain in the abdomen about 5 months back and was discharged "cured."

30*th July*, 1924, *Stomach, pylorus*.—Male, aged 30. Cancerous tumour involves the pylorus. Secondaries in the mesenteric glands and the liver.

15*th July*, 1925, *Stomach, pylorus*.—Male, aged 40. Scirrhus carcinoma of the pylorus.

APPENDIX C.

PANCREAS.

14*th July*, 1903, *Pancreas*.—Middle-aged male. "Carcinoma, head of the Pancreas."

4*th September*, 1906, *Pancreas*.—Male, aged 60. "Carcinoma, head of the Pancreas."

25*th August*, 1911, *Pancreas*.—Male, aged 55. "Carcinoma, head of the Pancreas."

4*th* May, 1915, *Pancreas*.—Female, aged 63. "Carcinoma, head of the Pancreas."

5*th June*, 1917, *Pancreas*.
"Carcinoma, head of the Pancreas."

20*th September*, 1918, *Pancreas*.
"Carcinoma, head of the Pancreas."

1*st February*, 1922, *Pancreas*.
"Carcinoma, head of the Pancreas."

APPENDIX D.

GALL-BLADDER.

16*th August*, 1919, *Gall-bladder*.—Male, aged 70. Secondaries in the liver and omentum.

4*th July*, 1908, *Gall-bladder*.—Female, aged 45. Secondaries in the liver and omentum.

ON THE TRANSMISSION OF PLAGUE BY *XENOPSYLLA ASTIA* AND *X. CHEOPIS*. PRELIMINARY OBSERVATIONS.*

By AMAR NATH GOYLE, M.B., Ph.D. (Lond.),

Plague Research Officer, U. P., Lucknow.

IT is scarcely necessary to emphasize the important part played by fleas in the dissemination of plague. The experimental researches of the Indian Plague Commission (1906) have definitely established the transmission of bubonic plague from rat to rat, from rat to man, and from man to man by the agency of rat fleas.

Though over 25 species of *Xenopsylla* are known to entomologists, only three species, namely, *X. cheopis*, *X. astia*, and *X. brasiliensis* have up to the present been found on Indian rats. *X. brasiliensis* has a very limited distribution; *X. cheopis* and *X. astia* are extremely common in India. Since the differentiation of these three species by Rothschild (1914), much time has been devoted to the consideration of the question of the relative efficiency of *X. cheopis* and *X. astia* as carriers of plague. Hirst first suggested in 1914 that the plague-free districts of the Madras Presidency owe their freedom from plague to the predominance of *X. astia*. Later, in 1923 he brought forward experimental evidence in support of his hypothesis that *X. astia* was a relatively less efficient vector of plague than *X. cheopis*. The question was taken up by Taylor and Chitré (1923), who using Madras rats as their test animals, reported that in their series of eleven experiments, there was successful transmission in four cases with *X. cheopis* and in three with *X. astia* under parallel conditions. In the guinea-pig series of eight experiments, *X. cheopis* carried in all the eight, whereas only one experiment was successful with *astia*. They came to the conclusion, with which Liston (1924) appears to agree, "that *astia* is capable of playing a part in the transmission of epizootic plague amongst rats under the climatic conditions present, but that it may be a somewhat less effective vector than *cheopis*."

The evidence at present available with regard to the relationship of the incidence of plague to the distribution of the different species is extremely conflicting. It was considered by the U. P. Government that this important question demanded renewed enquiry and I was deputed to undertake the investigation.

The methods of experiment will be described in detail in a subsequent communication, but I may say that they were essentially similar to those used by earlier workers, namely, the Indian Plague Commission (1906), Hirst (1923), Taylor and Chitré (1923). I might say a word, however, about the method of identifying live fleas. This has been a problem which has taxed the ingenuity and acumen of many investigators for a long time. It is important to examine the flea in the living condition. Hirst does this by lightly chloroforming them. To Taylor and Chitré, however, belongs the credit of devising a method which is swift, accurate, and practical. The method is as follows:—

"Examination was carried out in a capillary glass pipette drawn out to such a bore that a flea would be firmly held at some point in its length. A small glass funnel was placed in the wide end of the pipette and a flea 'poured' from a test tube into it. By blowing gently on the wide end of the pipette the flea was forced into the capillary portion and would be held motionless where the bore narrowed to a suitable size. The tip of the pipette was drawn small enough to prevent a flea from passing through. It was found that if the flea's head was facing the fine end it usually remained quiet. If facing the other way the flea would sometimes commence ruming up the capillary tube, especially if the taper was rather abrupt. By allowing the flea to emerge into the undrawn portion and manipulating it with a fine wire it could usually be turned in the right direction and kept running down the tube until it stuck. The capillary tube with the flea was examined under a binocular dissecting microscope and no difficulty was experienced in identifying the species. The pipette was held in the fingers of the left hand and on rotating it all aspects of the flea could be seen. An essential point was found to be the method of illumination of the specimen. The best results were obtained by covering

* Being a paper read at the Indian Science Congress, Lahore, in January, 1927.

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the microscope stage with white filter paper of a coarse surface and holding the pipette close down on it. The refraction due to the shape of the capillary tube gave little trouble when this was done.

A series of plague transmission experiments were carried out with rats from Madras and the U. P. during the months of November and December, 1926, at Lucknow. The rats in the U. P. were obtained from Jhansi, which rats, as shown by the Indian Plague Commission, are as susceptible to plague as the Madras rats. As the results in the two series show some difference, I shall discuss them under different heads. Out of seven experiments with Madras rats in which *X. astia* was used, successful transmission occurred in three: under exactly similar conditions, three out of seven experiments with *X. cheopis* were successful. In the eighth experiment, the inoculated rat in the *cheopis* cage did not die of plague, but there was successful transmission with *astia*.

With the Jhansi rats on the other hand, the results so far obtained show that *X. cheopis* is a much more efficient vector of plague than *X. astia;* for in a series of twelve experiments there has been successful transmission in nine with *cheopis* and in only three with *astia*. In two out of the three successful experiments with *astia* transmission was very much delayed as compared with the corresponding ones with *cheopis*.

In the two experiments with guinea-pigs, *cheopis* has carried plague in both, whereas *astia* has done so once only.

There appears to be something in the view lately expressed by Hirst (1925) that "Given highly susceptible animals, a virulent culture, and favourable climatic conditions, probably any rat-flea could be made to transmit plague in the laboratory, though it by no means follows that it would play a significant part in the spread of plague in nature." It appears probable that a relatively inefficient vector of plague such as *astia* can transmit plague to Madras rats, which in addition to being extremely susceptible have their vitality lowered by unaccustomed climatic conditions and transport over an excessive distance.

With a view to studying the importance of the sex of fleas in the transmission of plague, experiments were carried out with male and female fleas separately. The result of one such experiment was as follows:—

A rat was inoculated with plague and placed in each of the four transmission cages. Nine female *cheopis* were introduced into the first cage, the same number of male *cheopis* were introduced into the second cage, into the third and fourth cages nine male and nine female *astia* were introduced. The male *cheopis* and *astia* were found to transmit plague, whereas the females of both species failed to do so. I am inclined to believe that the male flea is a more efficient vector of plague than the female one.

To formulate any definite view in the present stage of our investigation is not possible. But if I may be allowed to make a tentative statement, to my mind, there seems to be some evidence to warrant the conclusion that *cheopis* carries plague more readily than *astia*. This communication is made with a view to eliciting criticism and suggestions which I think would help us considerably in our future experiments.

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CONSTANTS OF PURE COW GHEE.

By B. B. BRAHMACHARI, D.P.H.,
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Definition of the market commodity.—Ghee has been defined in Allen's *Commercial Organic Analysis* (1917 edition) (1) as "in the strict sense of the word, the pure clarified milk-fat of the buffalo, sheep, cow or the goat, but..... nearly always adulterated." Of over 900 samples of this article analysed in the course of the last 2¾ years in the Bengal Public Health Laboratory, the number certified as adulterated were as follows:—

Year.	Number of samples examined.	Number certified as adulterated.		Extreme instances of adulteration per cent. of the samples examined, Reichert Wollny value being	
		Actual number.	Percentage to total.	From 10 c.c. to 20 c.c.	Below 10 c.c.
1924	366	150	40·9	2·7	5·2
1925	305	112	36·7	3·0	6·2
1926 up to Sept.	234	82	34·9	3·8	9·4

Legal standards for constants.—Under the Bengal Food Adulteration Act 1919(2), the constants that have been taken as legal are the butyrorefractometer reading and the Reichert Wollny value, the standards fixed by the Local Government under the Act being:—

For	Butyrorefractometer reading at 40°C.	Reichert Wollny value.
Cow ghee ..	40 to 42	24 c.c.
Buffalo ghee ..	40 to 42	30 c.c.
Mixed ghee ..	40 to 42	28 c.c.

The standards of the Calcutta Corporation Laboratory (3) are also 41 to 42.5 for the butyrorefractometer reading at 40.5°C. for the ghee of

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both cow and buffalo; and 24 c.c. and 30.5 c.c. for the Reichert Wollny value of the two kinds respectively. The Reichert Wollny value of 24 c.c. for cow ghee is in consonance with the English practice, being recommended as the limit for butter-fat by the Butter Regulation Committee.

Genuine ghee.—Now the standards for Bengal were arrived at by reference to previous work of other laboratories and were verified in this laboratory by Mr. A. C. Das Gupta, B.SC., Assistant Chemical Analyst of the food section, on ghees melted on the water-bath from butter purchased from markets and believed to have been genuine; so both the methods of preparation and of collection left enough room for introduction of fallacies. I made my own ghees from genuine cow milk, but had no time to extend the examination to buffalo ghee. The ghees were prepared by myself from 52 cows, separately from each sample of milk, and according to the usual indigenous process. The milk was sterilised by boiling, and, when cooled, inoculated with *dahi* kept over night for curdling; in the morning, the butter was churned out, and then melted, not on the water-bath, but on an open fire in a pan, the temperature rising to about the boiling point of the fat, so that the traces of curd present were burnt and the characteristic aroma for which the article is valued was developed.

Analysis.—The samples were examined separately for each cow. To eliminate error from the personal factor, I got them all analysed by Mr. A. C. Das Gupta himself. Each sample was analysed for these constants in duplicate. For his careful and conscientious help in this investigation, I am very thankful to Mr. Das Gupta. The result of the analysis is given in the following table:—

Reichert Wollny value.	Butyro-refractometer reading.	Saponification value.	Iodine value.
19.5	44.2	217.4	41.4
20.2	44.3	218.5	32.9
20.2	42.4	217.3	42.2
20.6	44.6	213.9	42.6
21.0	41.1	217.7	41.4
21.2	43.7	218.5	42.0
21.3	43.8	220.5	41.9
21.9	44.0	215.2	40.8
21.9	44.2	216.2	42.1
22.2	43.1	219.2	35.9
22.3	42.2	222.5	33.5
22.3	42.7	219.4	35.5
22.7	44.6	219.5	44.1
23.1	43.7	221.1	40.6
23.1	43.4	221.2	39.6
23.3	42.5	225.1	38.0
23.4	43.3	221.3	37.7
23.5	43.6	220.5	41.7
23.7	44.0	219.6	39.9
23.8	43.1	222.6	38.0
24.1	43.4	not examined	not examined
24.1	42.2	223.7	32.9
24.2	42.8	224.5	37.3
24.2	42.7	225.3	37.7
24.4	42.9	221.3	35.5
24.4	41.8	224.6	32.7
24.4	43.7	220.0	41.1
24.5	42.2	224.3	35.2
24.9	41.9	226.7	31.7
25.3	41.8	227.2	32.0
25.7	42.6	221.8	36.6
25.7	42.6	222.4	37.2
27.4	42.5	227.5	34.0
27.4	41.9	224.0	35.8
28.4	41.8	228.3	34.7
28.5	42.6	226.1	38.6
28.6	40.3	233.5	27.1
28.9	41.4	229.6	34.4
28.9	42.4	228.0	39.2
28.9	40.3	232.8	27.5
29.1	40.2	231.9	30.1
29.1	40.2	231.2	27.8
29.4	40.0	234.4	26.7
29.4	39.8	234.0	26.2
29.5	39.6	235.5	25.6
29.9	41.5	230.9	33.1
30.1	41.1	229.3	35.1
30.4	41.4	233.1	34.7
31.7	41.3	229.2	32.9
34.7	40.5	232.7	29.8
42.4	40.3	236.4	29.8

RESULTS.

(1) *Reichert Wollny value,* (x).—Butyrin being the characteristic fat of ghee, the Reichert Wollny value, though arbitrary, may, for ordinary routine work be adhered to as a fair index for appraising the genuineness of the article. Fifty-one out of the fifty-two samples examined for it gave values ranging from 19.52 c.c. to 42.35 c.c., with 24.45 c.c. as the mean and 22.66 as the lower quartile. The average or arithmetic mean was 25.7, the standard deviation was 4.4, and so the probable error of the mean was only 0.4. If we leave out the value of 42.4 as aberrant, the mean would be 25.3 ± 0.4 c.c.

We have seen that the legal standard for this value for cow ghee in Bengal is 24 c.c. Now we find in this investigation that 20 out of the 50 samples examined, i.e., two-fifths of them gave figures below 24. The graph of the expansion $(\frac{2}{5} + \frac{3}{5})^{50}$ is a normal curve. Therefore, if from the observation, we take, e.g., 40 per cent. as the proportion of such cows everywhere, the error will be only $\pm \frac{0.6749}{50}\sqrt{\frac{20 \times 30}{5}} \times 100$, i.e., $\pm$ 2.3 per cent. We have also seen that the probable error of the mean was only 0.4. So the fifty cows examined were fairly representative of big herds or of a large number of cows

The average Reichert Wollny value of ghees from the first 20 cows is 22.5, and that from the remaining 30 cows is 27.5; therefore the value of ghee of a combination of r of the first and

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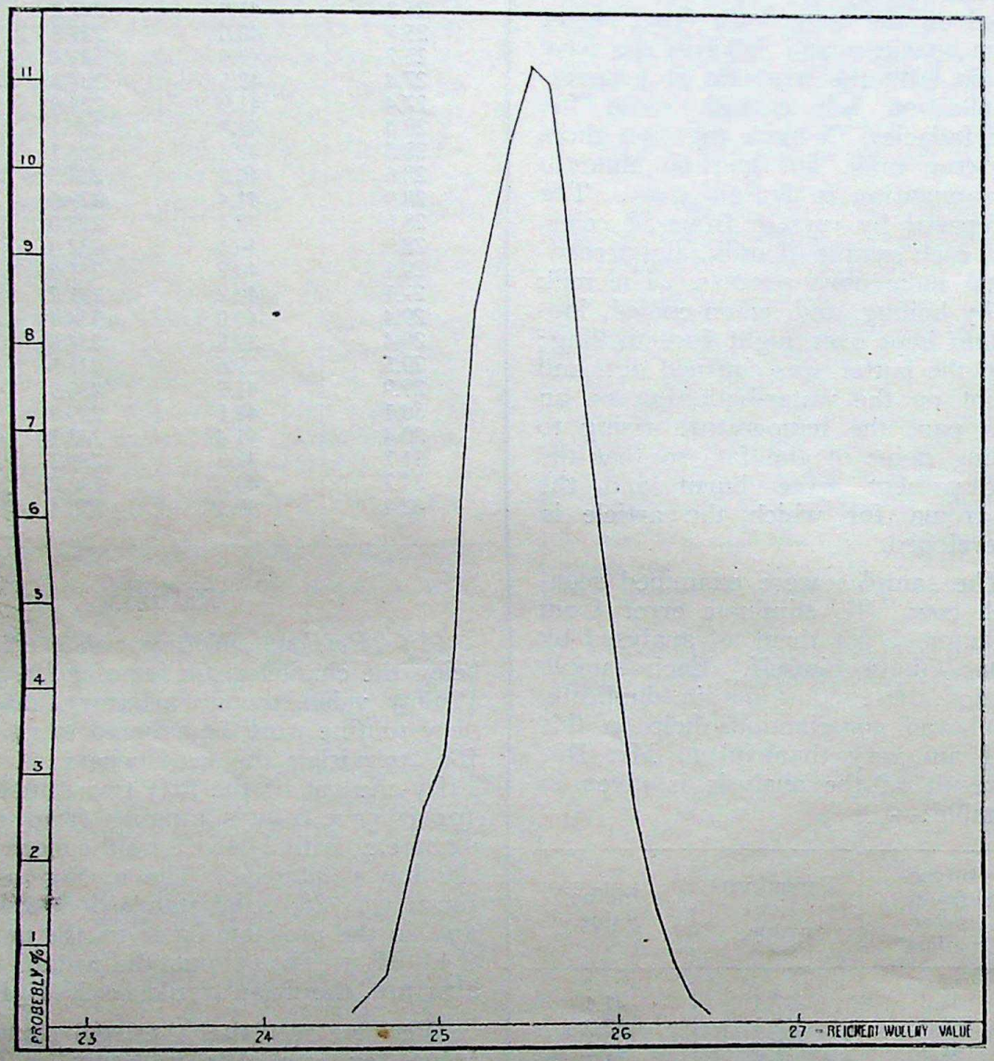
50 − r of the second is $\frac{22{\cdot}5r + 27{\cdot}5\ (50-r)}{50}$ and the probability of the value is $50\ Cr \left(\frac{2}{5}\right)^{50-r} \left(\frac{3}{5}\right)^{r}$

The chances of obtaining different values in the case of ghee collected and blended from big herds or a large number of cows are shown in the following graph. In such cases it is negligible for values from 24 c.c. downwards and from 26.6 c.c. upwards. Over 97 per cent. of the chances are for values between these two limits, the node being at about 25.5 c.c.



But cow ghee is a luxury; it fetches a far better price than buffalo ghee, prices for instance being at present Rs. 3-4 per seer for pure cow ghee against Rs. 2-4 per seer for the latter. Hence it is quite frequently hawked about in small quantities, which of course are raised from limited numbers of cows. In such cases, the chances of the value departing from the standard of 24 c.c., and for that matter of falling below that figure, are considerable. For instance, supposing the ghee is drawn from 5 cows, the chances of the value being:—

22·5 c.c.= 1 per cent.
23·4 c.c.= 8 per cent.
24·5 c.c.=23 per cent.
25·5 c.c.=34 per cent.
26·5 c.c.=26 per cent.
27·5 c.c.= 8 per cent.

(2) *Butyrorefractometer reading.*—This has been taken for a constant, and the standard for it is fixed at 40 to 42 at 40°C., obviously after the Calcutta Corporation Laboratory figures. But all authorities give the readings for butter-fat a more extensive range at the upper limit. Thus:—

Authority.	Temperature at which read.	Range given.	Remarks.
Moor and Partridge's *Aids to the Analysis of Food and Drugs*	35°C.	44 to 49 and an additional degree.	Equal to 41·35 to 46·25 at 40°C.
Martin's *Industrial Chemistry.*	40°C.	40·53 to 44·44 exceptionally up to 47°C.	
Richmond's *Dairy Chemistry.*	35°C.	43·7 to 49	41 to 46 at 40 C.

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Moor and Partridge would suspect genuineness only when the reading exceeds 47 at 35°C., which is 44.25 at 40°C. The range of our own figures for the 51 samples analysed was from 39.6 to 44.6 at 40°C. The following table compares these with the corresponding Reichert Wollny values:—

Range of Butyrore fractometer reading at 40°C.	Number of samples.	Number of samples of column 2 passing the local Reichert Wollny standard of 24 c.c.	
		Actual number	Percentage.
40 to 42	17	17	100
Below 40 to over 39	2	2	100
Above 42 to 43	14	10	71·4
Above 43 to 44	10	2	20
Above 44 to 45	8	nil.	nil.

The Calcutta Corporation Laboratory uses this reading for sorting out suspicious samples. We find it very suitable for the purpose, if by adulteration we mean samples giving a Reichert Wollny figure of less than 24 c.c. All the 19 samples giving refraction figures below 42 at 40°C. passed this Reichert Wollny standard. It is obviously wrong, however, to condemn samples on the ground that the refraction index is over 42, or even to use the reading as corroborative evidence; 12 out of our 32 genuine samples giving refraction readings over 42 at 40°C., i.e., 37.5 per cent. of them, had also Reichert Wollny values below 24 c.c.

The mean of our refractometer readings was 42.4; the standard deviation being 1.4, and the probable error of the mean 0.13. The correlation between them and the Reichert Wollny values is negative, the coefficient being — 0.68 ± 0.05.

(1) The saponification value (y) in the 51 samples examined was found to range between 213.9 and 236.4. The mean was 224.8; the standard deviation was 5.1, and therefore the probable error of the mean was 0.5. The correlation between these values and the Reichert Wollny figures is, therefore,

$$\delta = \frac{Exy}{Sx\ Sy} = +\ 0{\cdot}95 \pm 0{\cdot}01,$$

i.e., practically complete.

The regression coefficient $\left(+0{\cdot}95\frac{Sy}{Sx}\right)$ must be 1·24.

(2) The iodine value (z) varied from 25.6 to 44.1. The mean was 35.8; the standard deviation being 4.8, the probable error of it was 0.45. While the coefficient of its correlation with the Reichert Wollny value $\frac{E\ xz}{Sx\ Sz}$ is $-0{\cdot}63 \pm 0.05$; that with the saponification value $\frac{E\ yz}{Sy\ Sz}$ is -0.85 ± 0.08. nearly complete. The ergression cofficient in the latter correlation $\left(-0.85\frac{Sz}{Sy}\right)$ is $-0{\cdot}7$.

Therefore the saponification and the iodine values that are associated with the different Reichert Wollny values will be as follows:—

Reichert Wollny value (x)	Associated average (calculated).		Departure from the average, as found.	
	Saponification value (y)	Iodine value (z)	Minimum saponification value.	Maximum Iodine value.
19	216·5	41·4	nil.	nil.
20	217·7	40·5	213	42
21	218·9	39·7	215	42
22	220·2	38·9	219	44·2
23	221·4	37·9	219	42
24	222·6	37·1	220	41
25	223·9	36·1	221	37·5
26	225·2	35·2	....	..
27	226·4	34·4	224	36
28	227·6	33·5	226	38·8
29	228·9	32·5	nil.	33·5
30	230·1	31·8	229	35·1

(3) *Sophistication.*—The adulterants used may be:—

(I) Hydrocarbons free from fatty acid radicals such as paraffins.

(II) Natural fats with lower saponification value, and iodine value decidedly higher than the corresponding values for cow ghee.

Such as:—

Niger seed oil with iodine value =126—134
Sunflower „ „ „ „ =123—136
Safflower „ „ „ „ =130—149
Cotton seed „ „ „ „ =135—152
Poppy „ „ „ „ „ =153—158

(III) Natural fats with lower saponification value, but iodine value either about the same, or lower, or raised only correspondingly. Such as:—

Bassia tallows with iodine value = 54— 68
Kakum „ „ „ „ = 42
Animal „ „ „ „ = 33— 40
Arachis oil „ „ „ = 83—101
Sesame „ „ „ „ =103—107

(IV) Natural fats containing a decided amount of butyrin and with a higher saponification value, such as:—

Cocoanut oil with R.W. value =7 and iodine value 8.2—9.5.

Palmnut (kernel) oil with R.W. value =6 and iodine value =10.5 to 17.5.

The effect of adulteration of cow ghees of the different Reichert Wollny values will be as in following table:—

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Reichert Wollny value of the original cow ghee. (x)	Percentage of adulterant that will reduce (x) through 1 c c.		Limit of Corresponding Variation of the other two Associated values.						
			In group 1.		In group 4.		In the remaining groups.		
								Iodine value.	
	of groups 1, 2, 3.	of group 3.	Saponification value decreased at least by.	Iodine value decreased at most by.	Saponification value increased at least by	Iodine value decreased at most by.	Saponification value reduced.	In group 2 increased to.	In group 3.
20	5	7 1	—10·7	—2·0	+3·2	—2·2	Practically to those of the genuine cow ghee of the reduced R. W. value.	4 1	Correspond to those of the genuine cow ghee of the reduced R. W. value.
22	4·5	6·2	— 9·9	—1 8	+2·6	—1·5		3 8	
24	4 2	5 6	— 9·4	—1·5	+1·3	—1·2		3 6	
28	3·5	4 5	— 8·0	—1·1	+1·9	—1·1		3·4	

CONCLUSIONS.

(1) The butyrorefractometer reading is unreliable as a test for the purity of cow ghee, and is of no use even as corroborating the inference based on the Reichert Wollny value.

(2) With regard to the Reichert Wollny values:—

(I) If less than 19.5 c.c. the sample is certainly adulterated.

(II) If it is above 19.5 c.c. and

(*a*) If its relation to the other two constants is upset; the sample is adulterated.

(*b*) If both the latter constants are reduced below their associated values: the adulterant is free from fatty acid radicals.

(*c*) If the saponification value is increased and the iodine value decreased, they being brought to the level of a higher Reichert Wollny value, the adulterant is a fat of the cocoanut group.

(*d*) If the saponification value corresponds to the Reichert Wollny value, but the iodine value is decidedly higher: the adulterant is of group 2.

(*e*) If both the saponification and iodine values correspond to the Reichert Wollny value; this is genuine ghee.

(*f*) With Reichert Wollny figures below 24 c.c., and ghee blended from products of a very large number of cows: the chance of its being pure is negligible.

In the remaining cases of (*e*). and (*f*), i.e., when the Reichert Wollny value is higher than 24 c.c. or with the figure below 24 c.c., when the number of cows from which it is produced is limited: no inference is possible merely from these constants.

My object in carrying out this research was to test the value of the Reichert Wollny figure and of the butyrorefractometer reading only: so I have left out all other constants.

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A FEW IMPORTANT FACTS REGARDING MANUFACTURE OF SODA-WATER FROM THE CHALK-DERIVED WATER OF A DEEP TUBE WELL.*

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THE present work owes its inception to the request made by the manager of an aerated water manufacturing company in Calcutta for suggestions to improve the quality of their soda-water. He gave me to understand that the secret of success in their business lay in the quality of soda-water they could make, as the public judges the quality of other varieties of aerated water by the latter alone, although it is known to manufacturers that sweet drinks require much less carbon dioxide than soda-water. The chief complaint about their soda-water was that it did not hold as much carbon dioxide in solution as some of the best soda-waters placed on the market by other manufacturers.

The company employs the latest method of manufacture. Carbon dioxide is generated by means of sodium bicarbonate and sulphuric acid in "Riley's Safety Generator." The thorough admixture of gas and water is effected under a pressure of 70 to 75 lbs. per square inch by

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means of "Riley's Patent Double Soda-water Pump and Cylinder." Before this admixture the water is cooled to 15°C. by an ammonia cooling machine. The company's process of manufacture thus far is all right. They only follow the rule of thumb, ignoring altogether the scientific principles underlying the process. For instance, the charged water loses much of its cold while it is being conveyed through metal pipes from the carbonating plant to the bottling machine. The only solution of this problem lies in covering the metal pipes with some non-conducting material such as cork powder or felt. Another glaring defect lay in the overhead cold water reservoir into which the cooled water from the ammonia machine was pumped up and thence drawn downwards at intervals into the carbonating plant. A great loss of cold takes place here as it is exposed to the direct rays of the sun. These defects are of course obvious to any scientist, but might not strike an ordinary layman in charge of such a factory.

It is a common practice of soda-water manufacturers to add a little of the substance called "soda-salt" to the water before its impregnation with carbon dioxide in order to impart a peculiar pungent taste. The name "soda-water" is derived from the addition of this soda-salt, the amount generally ranging from 5 to 10 grains per pint. The company get their supply of this salt from Bush & Co. and usually add about 2 lbs. for every 500 gallons of water. The salt on analysis appears to consist mainly of sodium bicarbonate and a little sodium chloride.

Owing to the fact that the Calcutta Corporation does not allow any supply of their filtered water for any industrial purpose other than domestic purposes, the company had no other alternative than to obtain their supply from a deep tube well sunk on the site 500 feet below the ground-level. It is a chalky water having a fair amount of temporary hardness (19 parts per 100,000). Now it is interesting to see what effect the soda-salt has upon the water in so far as its carbon dioxide-retaining power is concerned. For this purpose, two lots of soda-water were made, one lot under the usual temperature of 68°F., and pressure of 75 lbs. per square inch without any addition of soda-salt, and another lot under the same temperature and pressure, but having the usual proportion of 0.04 per cent. of soda-salt added to it. As it was difficult to do estimation of the actual carbon dioxide content of the bottles of each lot for want of suitable arrangements, comparative estimations were made under the most carefully controlled laboratory conditions. It was found that the carbon dioxide content of a bottle belonging to one set was practically the same as that of a bottle belonging to another set. Thus it appears that the addition of soda-salt does not affect the carbon dioxide-retaining power of the tube well water. The "crown" corked bottles were found to contain more gas than the marble bottles. This is most probably due to the leakage of gas which occurs in the latter variety at the time of filling. It was also found that soda-water prepared with the addition of soda-salt was of better taste than the one without it. From laboratory experiments we found that an increased dose of soda-salt, or for that matter of pure sodium bicarbonate, has no effect on the carbon dioxide-absorbing power of the tube well water.

The production of a well carbonated soda-water which will retain the gas for a long period after the bottle has been opened depends to a great extent upon the temperature at which the liquid is charged with the gas. This point is of essential importance to manufacturers in hot climates, for the amount of gas that water can absorb decreases with rise in temperature. Water carbonated and bottled at a temperature of 40°F. under a pressure of 70 lbs. per square inch will be found to contain much more gas than when bottled at a pressure of 120 lbs. at the ordinary summer temperature. After repeated trials, the company was therefore advised to manufacture soda-water at a temperature of 60°F., which is 8°F. lower than their usual temperature of manufacture, retaining the usual impregnation pressure of 75 lbs. per square inch. We, however, tried to increase the pressure by 10 lbs. but this was found too much, as bottles filled under these conditions automatically broke after a few hours' storage in the room under summer temperature. Any further lowering of the temperature of the water is also out of the question, as it not only requires the cooling machine to work proportionately for a much longer time, involving the company in unnecessary expense, but also an enormous pressure would be brought to bear upon the bottles, resulting in serious accidents, when they are liable to be exposed during storage to the ordinary summer temperature which is 30°F. higher.

It is a known fact that distilled water has a greater solvent action on gases than any other water, and that dissolved solids in general adversely affect the solvent power. With this object in view we thought of lowering the dissolved solid content of the tube well water by a suitable method, as the total elimination of the solids is not economically feasible. The fairly high temporary hardness in the water offered an excellent opportunity to attain this object by softening it with lime. The tube well water was, therefore, analysed for its saline constituents and dissolved carbon dioxide. The quantity of lime required to eliminate the calcium carbonate, etc., was calculated. A saturated solution of lime was prepared and an experiment was made with different doses of this solution and the tube well water in uniform jars to find the correct dose of lime that would actually eliminate all the temporary hardness. If the time allowed is 24 hours for the lime to act, then the actual dose needed is very near the theoretical amount.

The softened water obtained by adding the correct dose of lime to the tube well water was

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next compared with the raw water as regards their respective carbon dioxide-absorbing powers. An experiment was made for this purpose in the laboratory by passing carbon dioxide from a Kipp's apparatus into each of these waters, kept at constant temperature under uniform experimental conditions. We found that the softened water could hold more carbon dioxide gas in solution than the raw water and that the softened water so charged had the peculiar pungent taste, whereas the raw water thus treated had none. This shows that the addition of soda-salt for this purpose can be dispensed with altogether.

Next we wanted to find what would happen if a little more or a little less amount of lime than the correct dose was added to the water for softening, in so far as the carbon dioxide-absorbing power is concerned. We found by laboratory experiment that the softened water obtained by adding the correct dose of lime possessed a greater absorbing power than any other softened water.

Conclusion.—For the manufacture of soda-water, a chalky water having a high temporary hardness should be softened with lime. The proportion of lime to be added should be just sufficient to eliminate all the temporary hardness. Any excess of lime or deficiency in its amount is inhibitory to the carbon dioxide-absorbing power of the water. The soda-water made from the water thus softened possesses the same taste as that made from the raw water mixed with soda-salt. The addition of soda-salt or pure sodium bicarbonate does not help to increase the absorbing power of water.

My thanks are due to Dr. Khambata, Officiating Director, Bengal Public Health Laboratory, at whose instance this work was undertaken, and who gave me full laboratory facilities.

THE ELECTROPHONOIDE METHOD OF TREATING THE DEAF.*

By F. D. BANA, M.B., M.R.C.S., D.P.H., D.T.M. & H. (Lond.),

Junior Honorary Aural Surgeon, J. J. Hospital, Bombay.

ONE of the most obstinate and trying complaints which the aural surgeon is called upon to treat is deafness. Deafness is due to two groups of causes, extrinsic and intrinsic. Deafness due to extrinsic causes is produced by some obstruction of the auditory passages; in the external ear by wax, foreign bodies, swelling or growths: in the middle ear by blocking or tumefaction of the Eustachian tubes. The latter causes so-called Eustachian deafness. Wax and foreign bodies are easily removed by syringing or manipulation(1), and swellings and growths by appropriate means. Eustachian deafness is relieved by inflating or catheterising the Eustachian tubes. These methods yield very good and prompt results. Adenoids sometimes cause Eustachian deafness, which is relieved by removing them. A good illustration of this was the case of a child five years old who complained of deafness. No obstruction was found in the external ear but he had large adenoid masses. Hearing was restored to normal on removing the adenoids, which were of the size of a fair-sized walnut. They were pressing on the Eustachian orifices and caused deafness.

In the next group of causes, which are of intrinsic origin, the cure is more difficult and trying at times. These are (1) chronic catarrhal deafness, (2) otosclerosis, (3) nerve deafness, (4) Menière's disease or symptom-complex, and (5) deafness due to central lesions. It is with this group of cases that I shall deal here, as the condition is difficult to treat, and except for the Electrophonoide method of treating the deaf, there has been no other marked advance for the last fifty years or so. The Electrophonoide method was first started by a Dr. Helsmoortal of Antwerp, and followed by Dr. C. Cathcart, who has published a series of about one hundred cases and claims to have cured 68 per cent. of cases so far considered incurable(2). I have tried it in a few cases, and although the number is not great, I think the method promises good results, and so far is a distinct advance on any stereotyped method of treating the deaf.

A course of thirty sittings is required, which may be repeated if necessary after an interval of from six to twelve months. Early cases are distinctly benefited. Two such cases are:—A young man of thirty who suffered from chronic catarrhal deafness due to repeated colds. He could only hear normal conversation at a distance of ten feet and a whisper at about one foot. Normally the conversational distance for a healthy man is from sixty to eighty feet and for whispers about ten to fifteen feet. After about twenty sittings his hearing improved considerably and he now hears normally, and has had no relapse. The second is a case of a school-boy aged sixteen who had about twenty-five sittings; he had considerable difficulty in following his lessons at school and conversations at home. After the treatment he was able to follow his class and converse at home better than before. He did not, however, take the full number of sittings and I think he required a further course to effect a cure. Another case of very marked deafness was in a young woman of about 30, suffering from otosclerosis, who improved considerably under the first course. She began to hear street noises, bells ringing, and could follow table conversations at home which were not heard before. In such cases the results are gratifying but very slow. I have had under treatment two medical men of advanced age

* (Read before the Bombay Branch of the British Medical Association on the 4th March, 1927).

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suffering from chronic catarrhal deafness. Both had about ten sittings each with slight improvement and no worsening as they had feared. They did not take the full treatment however. In such cases it is very difficult to effect a complete cure. What one tries to do is to prevent the deafness from increasing further and making the patient's life a burden. Another case of chronic progressive deafness is at present under treatment. He is aged about eighty, and has deafness of both ears with giddiness and headaches at times. He has had about twenty sittings and now hears ordinary conversation without undue shouting, as was formerly the case. Before starting the treatment he was losing his hearing gradually; this the treatment has arrested and slightly improved. Such cases require longer courses, repeated at intervals. Another case of mixed treatment is of a man aged about forty-five who improved rapidly in about six sittings. He was deaf for some six months due to chronic catarrh of the middle ear. The catarrh was first cured by ionic treatment and the deafness completely overcome by the Electrophonoide method.

The apparatus consists of three mechanical larynges or registers, worked by an electric current, producing the whole gamut of the human voice from the lowest to the highest audible vibration, ranging from 80 to 3,500. The sounds produced can be varied by working the key-board and by shifting from one register to the other and *vice versa*. It is usual to start with the middle register, then to go to the highest, then through the middle register again to the lowest. On top of this a secondary current is superimposed and can be so varied as to produce a very effective vibratory massage of the auditory apparatus to suit each individual. When the instrument is worked the vibrations are conveyed to the ear by modified telephonic receivers and each ear is separately or alternately treated, but not both at the same time. The mode of action of these vibrations is thus graphically described by Dr. Cathcart:—"The vibrations produced by the Electrophonoide act first as sonorous phenomena, and secondly, as dynamic phenomena, and it is to this double action that we must attribute the results obtained. The whole object of this method of treatment for the deaf is in short a "re-education" of the receptive and perceptive parts of the organs of hearing. It is essential that there must be some residual power of hearing remaining. Stimulation of this reactivates these paths and resuscitates others to activity."

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A PRELIMINARY NOTE ON THE ACTION OF ANTIMONY COMPOUNDS ON THE BLOOD SERUM. A NEW SERUM TEST FOR KALA-AZAR.

By R. N. CHOPRA, M.A., M.D. (Cantab.),
MAJOR, I.M.S.,
Professor of Pharmacology,
in collaboration with
J. C. GUPTA, M.B. (Cal.),
and
J. C. DAVID, M.B., B.S. (Mad.),
(*From the department of Pharmacology, Calcutta School of Tropical Medicine and Hygiene.*)

DURING the course of an investigation by the senior author on the pharmacological action of antimony compounds, it was found necessary to inquire into the action of these compounds on the blood. It is a well known fact that after injection of compounds of antimony certain symptoms such as cough, dyspnœa, cyanosis, vomiting, etc., are produced. It has been stated that these symptoms are due, in part at any rate, to precipitation of an oxide of antimony or some other antimony compound in the capillaries of the lungs, but no proof of the occurrence of this precipitation has been given. We decided, therefore, to see if any change of this nature really does take place. We started this work by examining what effects are produced by solutions of different antimony compounds on the blood serum and corpuscles of kala-azar patients *in vitro*. We tried at first the effects produced by 4 per-cent. solutions of urea-stibamine, stiburea, and amino-stiburea, such as are injected intravenously, on the blood serum of kala-azar patients. We were surprised to find that when these solutions were brought into contact with the serum from a kala-azar patient in a Dreyer's tube, a thick flocculent precipitate was produced at the junction of the two. We then tested a number of non-kala-azar sera to see if similar changes were produced. The following table gives the results obtained with the first series of sera we tested. We have since done a large number of sera which confirm these observations and these results will be published in due course.

It will be seen that in the majority of cases no precipitate whatever was formed with non-kala-azar serum, while with sera obtained from advanced cases of malaria and some patients with skin diseases only a haziness or a slight precipitate was produced, which was readily distinguishable from the thick flocculent precipitate produced with kala-azar serum. We tested a number of antimony compounds and found that all the organic compounds of antimony produced the same phenomenon, though the precipitate produced by some of these compounds was more marked than that produced by others. Von Heyden's compound, Stibosan or No. 471, gave variable results, and the precipitate formed even in the kala-azar serum was not so distinctive in character as that with urea-stibamine. Von Heyden's compound No. 693 gave a precipitate

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with serum from most cases, but the precipitate produced with kala-azar serum was much thicker and heavier than that produced with non-kala-azar serum. As only a small quantity of this latter drug was available we could only test a limited number of sera with it. Antimonyl tartrates gave no precipitation whatever. The precipitate produced by urea-antimony compounds was quite thick and enabled one to distinguish readily between a kala-azar serum and a non-kala-azar serum.

It is also interesting to note that some of the organic compounds of arsenic, such as sulfarsenol or sulpharsphenamine, produce a well marked precipitate with kala-azar and other sera, but this precipitate completely disappears if the tubes are allowed to stand for about half an hour. The precipitate formed by antimony compounds with kala-azar serum remains unchanged after 24 hours.

Colloidal solutions of gold also give a characteristic reaction with kala-azar serum. If a few drops of kala-azar serum are added to a few cubic centimeters of colloidal gold solution in a test tube, it becomes turbid in a few minutes. If the tube is allowed to stand for 24 hours the turbidity settles down leaving a colourless solution. With non-kala-azar serum no such change is noticed, except perhaps in advanced cases of malaria which also show a similar turbidity.

It will be seen, therefore, that the precipitation produced by interaction of organic compounds of antimony, especially the urea compounds, with kala-azar serum appears to be a specific reaction and could be utilised as a test for the diagnosis of this disease. Sixteen out of nineteen kala-azar sera which gave positive results with this test also gave a positive aldehyde reaction (Napier) within a few minutes, and the three others were positive after 24 hours. The reaction of kala-azar serum in the two tests therefore appears to run parallel.

We suggest the following technique for the application of this test:—

Technique.—The serum separated from the blood is pipetted out in a capillary tube and put into a Dreyer's tube. A 4 per cent. solution of one of the antimony compounds—preferably urea compounds—is slowly added along the side of the tube to form a layer on the top. With kala-azar serum a thick flocculent precipitate forms at once, while with the other sera there is either no precipitate whatever or only a slight precipitate at the junction of the two.

The advantages of this test over the aldehyde test of Napier are that the effects produced are immediate, even in early cases of kala-azar, and it is not necessary to wait for 24 hours, as is the case with the aldehyde test when applied to early cases of kala-azar. Secondly, a smaller quantity of serum is required and the test may be done even in a capillary tube. It is not necessary to prepare a fresh solution of the antimony compounds every time a serum has to be tested. We prepared stock solutions of

TABLE I.

	Kala-azar.				Leprosy.				Malaria.				Filariasis.				Syphilis.				Healthy blood and other cases like Asthma, Jaundice, etc.			
	No. done.	+++	+	—	No.	+++	+	—	No.	+++	+	—	No.	+++	+	—	No.	+++	+	—	No.	+++	+	—
Amino-stiburea, Stiburea; and Urea-Stibamine.	19	19	Nil	Nil	12	Nil	1	11	8	Nil	2	6	4	Nil	Nil	4	2	Nil	Nil	2	5	0	0	5
Von Heyden 471, Stibosan ..	5	4	1	0	4	0	0	4	2	Nil	Nil	2												
Von Heyden 693 ...	3	3	0	0	3	0	3	0	2	2	0	0	1	1	0	0	1	1	0	0				
Sodium antimonyl Tartrate ..	18	0	0	18	4	0	0	1																
Formaldehyde (Napier's Test) ..	19	16	3	—	4	0	1	3																

+++ = A thick white flocculent precipitate occurring instantaneously at junction of the serum with the solutions.
++ = A moderate precipitate occurring instantaneously. — = No precipitate.

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urea-stibamine and these could be stored in stoppered bottles for 10 days or even longer and reacted quite well with the serum at the end of this period. Further investigations into the nature and applicability of this reaction are in progress.

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A Mirror of Hospital Practice.

A CASE OF COMPOUND FRACTURE OF THE SKULL.

By MOHAMED HUSSAIN ABDURRAZAK SOUDAGAR, *i/c Ranebennur Dispensary, Dharwar District, Bombay Presidency.*

A HINDU male child, 6 years of age, was brought to this dispensary on the 21st March, 1926, for the treatment of head injuries, due to his having been run over by a bullock cart.

On examination, it was found that a semi-circular flap of the scalp, measuring 5 in. by 4 in., composed of the occipito-frontalis and temporal muscles of the left side, had been stripped from the scalp and was hanging over the face and ear. The bones forming the temporal fossa had been exposed and flattened by the pressure of the wheel of the cart. The antero-inferior angle of the left parietal bone had been disarticulated and depressed, causing considerable hæmorrhage inside the skull. The torn flap had been badly crushed and was full of embedded particles of earth and sand. The child was conscious and without any symptoms of brain injury, despite the severe character of the skull injuries. His parents, who lived close to the dispensary, refused to have him admitted as an in-patient. He was, therefore, operated upon, and transferred to his home to be treated as an out-patient.

Operation.—The flap was cleansed as thoroughly as possible and all foreign particles removed. Loose pieces of skin and muscles were excised and the flap sutured into position with a few loose sutures here and there, as it was recognised that sepsis would be almost inevitable. The entire wound was cleaned, dressed, and the patient returned to his home.

As was to be expected, the entire wound became septic, with a very foul discharge for more than one month. Almost the whole of the flap sloughed, laying bare the underlying bones. Pus was evident issuing from within the cranial cavity. The parents were repeatedly advised to take the child for treatment to the headquarters Civil Hospital, Dharwar, but would not do so.

A month and a half after operation, the wound commenced to heal slowly by granulation. The outer table of the skull, being deprived of its blood supply, became brittle, and for a few days dead sloughs of bone came away from this area. The wound finally granulated over completely and healed in a little more than four months after the date of injury.

The wound was repeatedly syringed during healing with strong permanganate of potassium lotion, with hydrarg. perchloride lotion, with iodine lotion, and was painted over with tincture of iodine after cleansing. After cleansing a dressing of boracic ointment on lint was used. No dusting powder was employed, as I have found that dry boracic acid powder causes more irritation and discharge than benefit during healing of such ulcers. The photograph shows the

area involved, and was taken during the healing of the wound.

Notes.—The points of interest about the case are:—

(1) Although the part of the skull concerned was distinctly flattened by the pressure of the wheel of the cart, no symptoms of cerebral compression were noticed at any time.

(2) Although this was followed by exudation of pus from within the cranial cavity, no symptoms of meningitis or of cranial mischief were noted.

(3) The fibrosis around the wound appeared to have prevented tracking of the extra-dural pus towards the base of the skull, and the infective process remained limited.

(4) The young age of the patient must have contributed materially towards his complete recovery from so severe a cranial injury.

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THE VALUE OF INJECTIONS OF CARBOLIC ACID AND MAGNESIUM SULPHATE IN THE TREATMENT OF TETANUS.

By P. BHASKARA RAU,

Sub-assistant Surgeon, Local Fund Hospital, Narasapatam, Vizagapatam District.

IN the *Lancet* for the 3rd of April, 1926, there appears an article by Dr. C. Worster-Drought, M.D. (Cantab.), late Special Tetanus Officer (R. A. M. C.), based upon the results of a wealth of clinical experience of the disease. In this he makes out an exceedingly strong case for the routine use of antitetanic serum, and there is no doubt that in the Army, or in an institution where funds are unlimited, or in a country with a first class hospital system, maintained either by public funds or by private generosity, there is no other line of treatment which will give such admirable results. Yet antitetanic serum is difficult to procure and prohibitive in cost in the smaller hospitals in India; indeed, it is but rarely used even in the larger and most up-to-date hospitals in India.

Dr. Worster-Drought writes "Of other remedies that have been advocated there is no evidence that injections, either of carbolic acid or magnesium sulphate, have any curative value." My excuse for publishing this note is to bring forward evidence of the value of these condemned remedies; indeed, readers of this journal are not unaware that undoubted cases of developed tetanus have been successfully treated by such injections.

The following are notes on the case-history concerned:—

On January 3rd, 1926, a young man, some 16 years of age, was brought to my hospital at 5 p.m. with a crushed hand and forearm, and in a state of collapse. The boy had been sleepily feeding a country sugar-cane mill with canes in the early morning, when his hand had been caught between the rollers. The usual country-side treatment had been applied, consisting in applying a thick paste of some unknown roots, leaves, herbs, and various ingredients over the whole of the injured limb.

On admission, he was in a state of profound collapse. The whole of the injured part was covered with a crust of paste and blood, and there was still some oozing present. Compound comminuted fractures of both bones of the forearm were present at two sites, the highest being about an inch below the upper third of the limb. The whole hand had been reduced to a pulp. I decided on amputation, and sent to the nearest medical man for help.

On the third day after the accident the limb was amputated through the upper third of the forearm, in the hope of leaving at least a small stump of forearm. As one anticipated, the wound became septic. The patient was given two intravenous injections of a watery solution of iodine, but on the fifteenth day after operation he complained (for the first time) of pain in the jaws. During the next 24 hours he developed all the classical signs and symptoms of tetanus. The ideal anti-serum treatment was not to be had, for the simple but sufficient reason that neither the hospital nor the patient could afford it. Nevertheless, my reputation and that of the hospital were at stake, for in *mofussil* practice a single failure is often sufficient to damn both the doctor and the dispensary concerned.

Treatment.—The following routine treatment was adopted:—

(*a*) The lower bowel was first thoroughly emptied by a double enema.

(*b*) For the first two days he was given an injection subcutaneously of 20 minims of a 2 per cent. solution of carbolic acid in distilled water once every six hours. This did not do much good, and on the third day the treatment was changed to

(*c*) Alternate subcutaneous injections every six hours of 20 minims of 2 per cent. carbolic acid, and of 20 minims of a 25 per cent. solution of magnesium sulphate in sterile distilled water. The patient was thus receiving four subcutaneous injections a day.

On the fourth day a small rubber tube could be inserted between the jaws; small quantities of milk were given, and a mixture of chloral hydrate and potassium bromide was given by the tube.

The patient under this line of treatment made a slow but decided, and finally complete, recovery. He subsequently developed malaria, for which he was treated by intramuscular injections of quinine. In all he received 40 subcutaneous injections for the tetanus; 3 intramuscular injections of quinine for the malaria; 2 intravenous injections of iodine for the sepsis.

At the time of his discharge from hospital he was in robust health.

NOTES.

In the absence of the specific treatment with the serum, either on account of its prohibitive cost, or to its not being available in sufficient bulk to bring about a cure, there seems to be nothing for it but to fall back upon the treatment by injections of carbolic acid and magnesium sulphate. With regard to this treatment:—

(1) It is very cheap—an important consideration to officers in charge of outlying dispensaries.

(2) The drugs required are available, even in the smallest dispensary.

(3) No special apparatus is required, other than a 2 c.c. hypodermic syringe.

(4) The giving of the injections can be entrusted to a nurse, or senior student, or compounder, or even a ward orderly.

I desire to thank Dr. N. Venkataswamy, my district medical officer, for his kind permission to publish notes on this case, and also the medical officers of Nakkapalle and Uratla for their kind assistance in the operation for amputation.

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Indian Medical Gazette.

JUNE.

WANTED A POLICY.

FOR several years we have been urging the need for a comprehensive enquiry into the best means of dealing with preventable diseases and inefficiency in India, but hitherto the response to our appeal has been such as is usually received by well meaning cranks.

We are so firmly convinced of the importance of the matter that we deliberately risk being regarded as tiresome and troublesome people who insist on forcing their views where they are not wanted. The position in India to-day is that medical investigators throughout the world have shown us the causes of all the great fatal diseases of the tropics; they have also shown us how to control these, but it is beyond their powers to put their teachings into practice. Let us look for a moment at what has been done in the past. Most foreign peoples are under the impression that little has been done in India to control cholera, malaria, and the half dozen other great fatal diseases of this country. This is a mistaken view: India in the past has been a pioneer in tropical sanitation and it may come as a surprise to many to learn that India has frequently been held up as an example to other countries of what can be done by sanitary administration. Up till quite recently there has been no great country in the tropics which has had so advanced a system of medical relief and disease prevention. Vaccination has been remarkably organised and has saved millions of lives. Our Government of sixty years ago adopted as its deliberate policy the education of the people for the purpose of creating a spirit of goodwill to public health measures: it was believed, perhaps rightly, that any attempt to force sanitary reform on a resisting community would result in harm and would not accomplish the desired object. The position now is that there are large numbers of hospitals and dispensaries all over the country; these are made use of by many millions of people and the goodwill which was hoped for has been built up in gratifying measure.

Public health has not been neglected; increasing sums are being voted every year, and administrators and governments are working in cordial co-operation to remedy the evils whose existence is recognised by all.

India, in fact, can make out a case which would probably convince any impartial outsider that she is far from deserving the reproach of indifference to the health of the community, and if we were only concerned with making an apology there would be little difficulty in doing so.

It is not our business to make a good case to outsiders, but to take stock of the existing position and to ask ourselves whether our public health measures are the best that can be devised and whether they have been brought into harmony with modern requirements. The time has come when it is possible to wage war on disease in a scientific manner; we know how to control all the great fatal diseases, we have tracked them to their strongholds and we know the weapons by which they can be destroyed. We have a small army which is employed for the purpose of controlling these diseases and is carrying on a very creditable guerilla warfare. So far so good, but it can safely be said that no great war in modern times has been waged in so haphazard a manner and with such a wastage of effort. For any campaign of importance there must be a close investigation of the position and forces of the enemy, and there must be a definite plan for the co-ordination of the forces which are engaged. If these requirements are not fulfilled, success must be greatly delayed and large sums of money must be wasted.

If we are asked to produce our plan, we at once reply that we have not a ready-made scheme; there are already dozens of plans, some of which are actually in working, while others are being hastily prepared. We have no desire to add another to the many excellent plans which are in existence; what we want is the deliberate study of the situation and the formation of a definite scheme of operations. The tendency in recent years has been to make public health a local concern; the Government of India entrusts medical matters to the local governments, these in turn tell the local bodies that it is their business to attend to the health of the communities which are within their jurisdiction. The local bodies with equal logic might well say to each individual that he ought to look out for himself. It is quite true that health to a large extent is a matter for each person, but it is also a concern of each government, and to an important degree it is a concern of the Government of India. Any good working scheme will entail the discharge of well-defined duties and responsibilities, not only by local bodies but also by the provincial governments and the Government of India.

We might easily have a huge force of thousands of public health workers, but if their efforts are to be put forth in an ill-disciplined and non-co-ordinated manner the result will always be unsatisfactory.

In England and all the countries in which public health has become a great power for good there is a definite co-ordination of effort; the local bodies have considerable powers, but these are exercised under conditions which have been prescribed by the State after a thorough examination of the whole problem. Can we expect a backward country like India to succeed under a much less favourable system than that which has been found necessary in more advanced

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countries? Trial and error is a method which is sometimes adopted for want of a better, but sanitation has now become an exact science to a remarkable degree; if it is not guided and controlled by experts working on a deliberate plan it becomes a haphazard and inefficient affair. The present moment is exceptionally critical in two respects; most of the local governments have suddenly found themselves in possession of surplus funds which they are rightly devoting to public health and education; plans for expenditure have to be prepared in a hasty manner, and personnel has to be got together without adequate previous training. Under these conditions it is impossible to expect that an orderly and efficient advance will be made. There is also the possibility of financial stringency in the future: experience teaches us that this will be followed by sudden curtailment of the funds which are available for medical purposes.

The times are also critical in that the second stage of development of the new Reform Scheme of government will shortly be planned. Under these circumstances it is time that the relations which are to exist between the central government and the local governments should be carefully studied. The whole future policy in public health matters may be seriously compromised if it is not worked out after careful deliberation.

What reasons have we for suggesting that the existing system is not ideal? The first reason is that there is no uniformity; under the old dispensation a system grew up which was quite satisfactory, considering the conditions which existed at the time; there was little money available, but there was a considerable degree of control and co-ordination, and owing to the smallness of the medical budgets there was not much room for waste. Then followed the period in which larger sums became available and each local government proceeded to carry out experiments on its own lines. These have not all been equally successful, but they have served the useful purpose of supplying valuable information as to the relative merits of the respective schemes. Now we are faced with the prospect of great expansion and it becomes urgently necessary that this should take place in a well considered manner.

If concrete evidence is asked for as to the need for a deliberate enquiry into the problem of disease in India this can be supplied in a most convincing form. All the people who are concerned in medical and public health administration and all those who are engaged in medical research have expressed their views on the question in no uncertain terms. At all four conferences of medical research workers which have been held in Calcutta during the past four years a resolution was passed unanimously urging on Government the necessity for an exhaustive enquiry into the whole problem of preventable disease in India. Two successive directors of the Indian Medical Service, two Public Health Commissioners with the Government of India, almost all the Directors of Public Health of the Provinces, most of the Surgeon-Generals and Inspector-Generals with the local governments, and all the leading medical research workers of India were present and associated themselves with the passing of these resolutions which called attention to the fact that India is in a state of grave emergency, and that a thorough enquiry is needed. Even this imposing assemblage of experts did not produce a ready-made scheme, they wisely pointed out that the question was not one for medical experts only. The subject is too big to be dealt with on narrow lines; questions of education, economics, social customs and administration are involved.

The Royal Commission on Agriculture is an important advance in the right direction; this deals with one aspect of the question and it has recognised that health is one of the factors concerned with the prosperity of the workers of India. But although the medical experts who were called to give evidence before the Commission made remarkably complete and weighty pronouncements, the terms of reference of the Commission will not permit of their doing more than to record their opinion that preventable disease is one of the chief causes of the inefficiency of the agriculturist. A fitting complement to the Agricultural Commission would be a Commission to enquire into the causes and remedies of the disease prevalence which is responsible to so large an extent for the depressed economic condition of India. With administrators like Lord Irwin and the Earl of Birkenhead in charge of the destinies of India it is not too much to hope that this key problem will receive the attention which it deserves.

The most unfavourable feature of the situation is that the people of India, while keenly interested in medical relief and public health, are satisfied with opening new hospitals and medical schools without troubling themselves with forming a considered policy. It is becoming more and more fashionable to think parochially on such matters, and if Government were to refuse to act until forced to do so by public opinion, we might wait indefinitely for anything to be done. But we do not despair. The Agricultural Commission was not appointed in response to a popular demand: it was appointed because an able and far seeing statesman recognised that India cannot be prosperous unless production is increased and waste eliminated. It is equally true that India cannot be prosperous unless the drain of man-power which is caused by disease is stopped, and this cannot be done by throwing sand into the flowing river. A solid and well-engineered embankment is needed, and this can be constructed only after making a good working plan and then employing the best available experts on the work of construction.

There are pessimists who assure us that nothing can be done and that it is a waste of time and money to make an enquiry. To such we would

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point out that every country which has made a serious effort to institute a sound public health system has succeeded beyond all expectations. In India itself sanitation in the British and Indian armies has reduced the sickness and mortality to a fraction of what it used to be. In no case has success followed from adopting the policy or rather the lack of policy which is being pursued throughout the country at present. All that is wanted is a plan and we know how to make one; it is only the will that is lacking.

J. W. D. M.

MEDICAL EDUCATION IN INDIA.

THE recent visit of Sir Norman Walker to India is an event of no ordinary importance. Sir Norman was sent out to examine the conditions under which undergraduate medical education is conducted in this country with a special view to determining the future relations which will exist between the General Council of Medical Education and Registration of the United Kingdom and the Universities of India.

Some months previously the Calcutta University refused to permit the Inspector of the General Medical Council to inspect its medical examinations, on the grounds that such action was unusual: the result, of course, was that the Medical Council ceased to recognise the degrees of the University. It was believed by some of the representatives of the Calcutta University that the General Medical Council was exercising arbitrary powers, and suggestions were made that an appeal to the Privy Council would be successful in compelling the Medical Council to recognise the Degrees of the University for all time. Wiser counsels prevailed and the Calcutta University invited the General Medical Council to send a representative to inspect the existing conditions with a view to the restoration of the recognition of its medical degrees. It is hoped that the visit of Sir Norman Walker will result in the establishment of satisfactory relations between the Indian Universities and the General Medical Council.

The problem which Sir Norman has to solve is by no means simple; on the one hand he has to satisfy himself that the conditions of education and examination in this country are such that he can recommend the continued recognition of the degrees; on the other hand he also will naturally try to take such action as will promote the interests of medical education in India. Anyone who is familiar with the history of medical education in the United Kingdom will realise that the General Medical Council has played an important part in raising the standards of medical education; the method adopted was steady pressure on the examining bodies, and inspection of the examinations was the chief means of bringing about some degree of uniformity of standards and of improving the methods of the examinations.

India has long been left to her own devices and it is only natural that a certain amount of laxity should have crept in. The same thing would have happened in the United Kingdom under similar circumstances.

Then came the inevitable misgivings on the part of the Medical Council, but the unfortunate thing was that some attributed these misgivings to the machinations of members of the Indian Medical Service who were believed to be actuated by the unworthy motives of malice and jealousy. Under these circumstances rebellious feelings were aroused and the atmosphere was such as to make most people despair of the possibility of establishing satisfactory relations between the Indian Universities and the Medical Council.

The wise decision of the Medical Council to send out such an impartial emissary as Sir Norman Walker has resulted in the production of a much saner and calmer atmosphere. It is a thousand pities that all those who are interested in medical education in India did not frankly realise that serious defects existed and did not unite in making a determined effort to get rid of these defects. There were many who advocated such a policy, but some persisted in the view that an attack was being made on their liberties, and in consequence they desired to declare war.

The declaration of war was most unfortunate: for those against whom the declaration was issued refused to fight; they simply took up the attitude that each University was at liberty to take its own course, but if that course were inconsistent with the conditions which were laid down, relations must be broken off. Now the position of the Calcutta University is not that of trying to retain a recognition which had previously been given, but of applying for the restoration of a recognition which has been taken away. Even now good may come out of evil, and if it should be found necessary to make a greater effort to recover a lost privilege than to retain one which existed, the result will be satisfactory for all concerned.

None of us can deny the stimulating influence of friendly criticism by outside observers. So long as we are exempt from control or criticism we tend to get into a complacent frame of mind and we begin to resent the very idea of interference. Examiners who are given arbitrary powers become tyrants: they may be harsh tyrants or mild tyrants, but in their case the examinations are not likely to be satisfactory. What is needed is some sort of wise control, and it is only by devising a suitable control that Sir Norman can achieve his object. It is also necessary that the control which he proposes should be acceptable to the Universities of India. Even in the United Kingdom there was at first a good deal of resentment of outside control, just as there is in India to-day, but now a spirit of discipline has been established and the result has been eminently satisfactory.

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Sir Norman has the great advantage of being able to hear a frank and free statement of the views of all concerned; he has the greater advantage of being recognised as an impartial and friendly judge, so it is within the bounds of possibility that he will achieve a solution of a problem which under other circumstances would have appeared to be insoluble.

What we in India must realise is that we have to face an uphill fight and that it is our own interests that are at stake. The position of the General Medical Council throughout the Empire has been so firmly consolidated that it cannot be shaken by the defection of India; it is so firmly consolidated and its rule so soundly established that it will suffer no loss of strength or prestige by the revolt of India. It is ridiculous to imagine that the members of the Indian Medical Service are hostile to the interests of medical education in India. We may attribute the lowest and worst motives to them, but we ought to give them a little credit for having the instincts of self-preservation, and it is obvious that a breach with the General Medical Council would be as little to their interests as to those of the rank and file of Indian medical men.

J. W. D. M.

SPECIAL ARTICLES.

THE APPLICATION OF OUR KNOWLEDGE OF TUBERCULOSIS TO INDIAN CONDITIONS.*

By C. FRIMODT-MOLLER, M.B., Ch.B. (Copenhagen),
Medical Superintendent, Union Mission Tuberculosis Sanatorium, Arogyavaram, near Madanapalle.

1. *The decline of tuberculosis in the West and its increase in India.*

During the last fifty years a most remarkable decline of tuberculosis has occurred in some of the countries in the West.

While the death-rate from all forms of tuberculosis in England and Wales(1) during the decade of 1851—1860 was 348 per 100,000 population, in the decade 1911-1920, it had fallen to 171. In 1922 this death-rate was 112 only. Tuberculosis in England during the last half century has shown a constantly accelerated rate of decline.

In other countries in Europe, in the United States of America and in the British Dominions, a similar decline has taken place. In contrast to this decline we have before us in the tropics the sad experience of a steady increase of tuberculosis during the very same period. Increase is thus reported from certain countries in Africa(2), from the Philippines(3), from Brazil(4), and, what concerns us most, also from India.

As a result of his investigations Lankester(5) states that "many large areas in India which 40 years ago were practically 'virgin soil' to tuberculosis have now become to a considerable extent infected." Sir Leonard Rogers(6) in a recent publication states that *post-mortem* examinations in the Medical College Hospital, Calcutta, show "a higher mortality in Calcutta from tuberculosis than from any of the so-called tropical diseases," and he adds that the vital statistics of Calcutta show a still higher mortality from this disease. To this grave picture can be added that of Bombay, where according to Lankester there are more than 10,000 active cases of tuberculosis.

Another proof of the very high prevalence of tuberculosis infection in India is given by Kesava Pai and Venugopal(7). They find in Madras an infection rate by Von Pirquet's skin-reaction of 94.2 per cent. among the general population for all ages. This is very high compared with Europe. In Lille in France(8), the country which in 1912 had the highest death-rate from tuberculosis of all western countries, the corresponding infection rate was at that time reported to be only 60 per cent.

2. *Conditions in India favouring the increase of tuberculosis.*

(*a*) *Climatic Conditions.*—It has been known in the West for the last century that unfavourable climatic conditions are very detrimental to the treatment of tuberculosis. Recent researches in England have confirmed this and Gordon(9) has shown that populations exposed to strong, prevalent rain-bearing winds tend to suffer appreciably more from pulmonary tuberculosis than populations in districts sheltered from these winds. Lankester(5) and Sir Leonard Rogers(10) have shown a high tuberculosis incidence in the areas of India with heavy rainfall and exposure to the monsoon storms.

Researches carried out at the Sanatorium near Madanapalle(11) have shown the very detrimental influence of heat on tuberculosis patients, as proved by the average weekly weight curve showing that the patients gain least in weight during the three hottest months where the mean maximum temperature reaches 94.4,° 96.3,° and 94.7°F. Not less convincing is the curve showing the percentage of patients confined to bed during the different months. In the three hottest months 33 per cent. are confined to bed as against 19 per cent. in the cooler months.

That good climatic conditions are no absolute protection against the spread of tuberculosis in India, is manifested by the extreme prevalence of the disease in a city like Hyderabad (Deccan) situated in a very good climate and said to have been comparatively free from tuberculosis 40 years ago.

* Paper read at the Fourteenth Indian Science Congress at Lahore, January, 1927.

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The question of climate should certainly be borne in mind in selecting places for sanatoria, although the disease is spreading in all climates in India, even in those which are favourable, when once the infection has gained entrance.

(*b*) *Hygienic and Economic Conditions and Social Customs.*—That bad sanitary and hygienic conditions and a minimum level of subsistence for a large part of the population supply a soil favourable for the spread of the disease goes without saying. It might however be the place here to point out that the decline of tuberculosis, as experienced in the West, cannot be entirely accounted for by the improvement in general hygiene and sanitation, and by the raising of the standard of living, as for instance in England(12) the reduction in general mortality has been much less than the reduction in mortality from tuberculosis, the reduction of the former in the last decade being only 10 per cent. as compared with 31 per cent. for the latter. The direct attack on the disease by curative and preventive measures is to be credited with the accelerated rate of decline of tuberculosis.

This is of the greatest importance when we consider the question of combating tuberculosis in India. We know the terrible toll the disease takes amongst the women who are under the purdah system, as for example reported by the Health Officer of Calcutta(13). We also know the high prevalence of the disease in the slums of the big cities in India. To trust that the disease will decline when the general sanitary conditions improve sufficiently and adverse social customs break down in India, and to do nothing in the meantime to combat the disease by curative and preventive measures, will have disastrous results.

(*c*) *Development of Western Education and Industrialism.*—The necessity for a direct campaign against the disease by curative and preventive measures is still more obvious when we observe that tuberculosis is spreading rapidly amongst the educated classes and the more prosperous communities(5) in spite of the comparatively improved hygiene they enjoy. The reason is the greater exposure to infection amongst these classes nowadays through schools and colleges.

The great industrial centres which have come into existence in India are indirectly responsible for the spread of tuberculosis, as they draw to the cities thousands of immigrants of whom many contract the disease, being exposed to the heavy infection amongst the city population. They then return with the disease to their villages and become dangerous sources of infection in the non-immune rural population, among whom the disease spreads with alarming rapidity(5 & 13).

(*d*) *Increased Communications.*—Increased communications stimulate the spread of the disease from cities to rural tracts, and it can be seen in India(5) as elsewhere in the tropics(2) how tuberculosis travels along the larger lines of communication.

With these Indian conditions in mind one cannot but agree with Lankester(5) in his statement "that the present-day social and industrial changes present a challenge to sanitary efforts to be vigilant and active, since the very advances which seem to make for higher standards of healthy living themselves bring dangers in their train."

3. *The Line of Attack on Tuberculosis followed in the West and the Problem facing India.*

It cannot be a mere coincidence that in most western countries the decline of tuberculosis began shortly after 1882 when Koch discovered the tubercle bacillus. In England and Scotland a steady decline had however been observed earlier. From 1866 the decline has been marked and still continues in England. Contrary to this a steady increase in the disease is observed in Ireland until after 1900. Newsholme(14) explains the earlier decline in England and Scotland to be due to the fact that from the time mentioned pauper consumptives were advised treatment in special hospitals, while in Ireland they were treated in their own homes by public support. The campaign introduced in other countries after 1882 was in this way already begun earlier in Great Britain. In France(15) where no real measures against the disease were introduced till after 1912, no appreciable decline was experienced, and it had the highest death-rate of all western countries.

The line of action taken in the West where the campaign has succeeded, has been the introduction of great facilities for institutional treatment and thereby the isolation of the sick, and a broadcasting of information regarding the infectious nature of the disease. Along with these measures the general improvement of sanitary and hygienic conditions have of course had their share in decreasing the disease.

The facilities for institutional treatment in England and Wales have developed so far (16) that about 30 per cent. of deaths from tuberculosis occur in hospitals, and in London even as much as 50 per cent. In Denmark(17) with the lowest death-rate from tuberculosis in Europe, 33 per cent. of deaths occur in hospitals, in Copenhagen up to 70 per cent.

The institutional treatment consists of sanatorium treatment for earlier cases, hospital treatment for the advanced, while to the dispensaries is allotted the work of detecting the cases and rendering help in the homes.

In Great Britain(12) in 1922 there were 23,031 beds available for tubercular patients. In Scotland(18) alone there are 104 sanatoria and special hospitals with 3,711 beds. The

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greatest number of beds for tuberculosis in proportion to the population is found in Denmark(17) where there are now 115 beds available for every 100 patients who die from tuberculosis, and 107 beds per 100,000 population.

Turning now to India, we find dispensaries introduced in several of the greater cities, while the facilities for institutional treatment are very small indeed. If beds were to be available in the whole of India in the same proportion to the population as in Denmark for instance, there should be about 340,000 beds for tubercular patients, while we find altogether 800 or 900. Regarding measures for treatment and isolation practically nothing has been done in India, and upon these measures rests the success of combating the disease and checking the steady increase of this terrible plague.

4. *Sanatorium treatment in the West and its value in India.*

In Europe it was sanatorium treatment which first of all impressed upon the public that it was not hopeless to fight tuberculosis. The importance of this link in the campaign is well demonstrated by the fact that when in 1919 legislation was passed in France(15) for an earnest campaign against the disease, the Act compelled each county in the country to provide a sanatorium within 10 years. This would not have been done if the experience in other countries in Europe had not brought out the necessity for a sanatorium movement in addition to the construction of special hospitals.

It is in the sanatoria in the West that the whole modern treatment of the disease has been worked out, and from there the principles of it have penetrated not only to the whole medical profession but also to the public. In the West it is now possible to treat the disease with success also in hospitals and homes, but only because there the disease is treated also on sanatorium principles as far as can be done.

It may not be out of place here to mention the principles of treatment, which does not consist in open-air treatment only. It is certainly not sufficient to tell the patient that he must live in the open air and take rest in order to get rid of the disease. The treatment consists of a special treatment carried out in the open air, which is quite a different thing. The secret of the treatment is the alternation of rest and graded exercises in each individual case with due consideration of all the clinical symptoms and of the extension of the lesions in the lungs. The exercise sets free from the tubercular foci a certain amount of toxins which call into action the defensive forces of the body to cope with the infection.

Besides this special treatment which is the sanatorium treatment proper, there are now several remedies to be used in selected cases, such as pneumothorax treatment, tuberculin, auto-vaccines, sanocrysin and various other kinds of medicinal and surgical treatments. It it not possible here to go further into the question of treatment, but it must be added that it is as necessary to secure for the patient quietness and rest of mind as rest of the body, which is best brought about in sanatoria built away from cities in isolated surroundings.

Sanatorium treatment in India(19) has been shown to be of not less value than in the West, perhaps even of more value when Indian conditions are taken into consideration. In the sanatorium at Madanapalle the treatment of 1,330 patients discharged from 1915-1924 produced a "positive result" in 72.2 per cent. Its value is brought out better by considering the "after-results." If we consider the condition of 807 patients 5 years after the date of discharge in each case, we find that 54.5 per cent. were living and well. But this would be reduced to 31.5 per cent. if we took into consideration the patients whose after-histories could not be traced, and considered them dead, which of course they were not. In stage I, we find that, after 5 years, of those discharged as "arrested" about 86 per cent. (54 per cent. including the unknown) were alive and working, and in stage II, 81 (54) per cent. Of those discharged as "much improved" in stage I, 72 (43) per cent. were alive and working, in stage II, 55 (29) per cent. and in stage III, 35 (23) per cent. These results compare very favourably with those obtained in the West.

The fact of having as good immediate results on discharge as in the West alone would show the benefit of sanatorium treatment in India. But the facts are that we have not only equally good immediate results but apparently also equally good after-results, in spite of the far less favourable conditions under which the patients discharged usually live compared with those in the West. This proves the even greater value of sanatorium treatment in India.

5. *Sanatoria as Centres for Research Work in the Treatment of Tuberculosis in India, and the Lines to be followed in this Research.*

Facilities for research work in tuberculosis in India demand well-equipped and sufficiently staffed sanatoria of considerable size.

The influence of complications on the treatment of tuberculosis must be carefully studied, and experience shows specially the importance of this in India where complications such as malaria, helminthiasis, and dysentery play an important rôle in lowering the resistance of the patient. The fact is that it may even be

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said that the treatment of tuberculosis in India consists to a large extent in the treatment of complications. Only in this way can the special treatment have its fullest effect.

A further research which should be undertaken is the scientific testing under Indian conditions of the different kinds of remedies and treatments used. Such a testing can only be done when the sanatorium has a fully equipped laboratory where the necessary serological examinations can be carried out investigating the defensive forces and mechanism of the body, and the production of immunity under these various remedies and treatments. It can only be done when the number of patients is sufficient to allow for control cases without prejudicing their treatment, and when all can be treated under equal conditions. From such sanatoria real guidance might be given to general practitioners and to the public about the value in India of various remedies which are advertised, but are either of little real value or even dangerous, especially if used indiscriminately without due consideration of the different stages of the disease.

Moreover, new diagnostic and prognostic methods, often of great value, should be tested in such sanatoria or in special hospitals to define their value with regard to Indian patients. It suffices here to mention the sedimentation test and the complement fixation test to illustrate what is meant.

The whole question of heliotherapy needs a thorough scientific investigation in India; but this can only be done in such an institution, when the results can be compared with those obtained with the different artificially produced rays.

No sensible person will dream of the possibility of building sanatoria in India on the same scale as in the West. Nevertheless the sanatorium movement will no doubt prove to be the backbone in India of the whole campaign against tuberculosis. At least one large sanatorium should be built as a beginning in each province in order to demonstrate the curability of the disease when coming early enough under proper treatment.

6. *Sanatoria as Centres for Training of Doctors in the Treatment of Tuberculosis in India.*

An absolutely essential condition for any successful campaign against tuberculosis in India is the thorough training of doctors and medical students in the principles of modern treatment.

Such treatment cannot be learned from books alone or from the demonstration of a few cases in a small tuberculosis ward attached to a general hospital. Only in a large sanatorium can the proper principles of treatment be demonstrated and taught, although much can also be learnt in a large tuberculosis hospital.

The lack of understanding of the nature of the disease among many of our colleagues in India is simply appalling, and we can never expect the public to face properly the problems of tuberculosis until the medical profession has this understanding.

7. *Tuberculosis Hospitals—cheap and lightly constructed outside larger towns. Larger Hospitals with research facilities in provincial capitals.*

As already mentioned it was the effect of isolating the sick persons, not only for the sake of treating the disease but also for the sake of preventing the spread of infection, which more than any other measure caused the decline of tuberculosis in the West.

In India where we have probably to deal with millions of active cases of tuberculosis, it is out of all consideration to build sanatoria and hospitals with even a reasonably adequate supply of beds to deal with such overwhelming numbers. But this does not mean that much cannot be done in India where climate and customs allow of much simpler constructions than are required in the West.

A real campaign will never be started before a number of smaller special hospitals are constructed near cities and towns for treatment of those patients who are too sick to travel to a sanatorium in a better climate, or cannot do so on account of lack of accommodation or for any other reasons. These patients should be cared for in such hospitals and thereby also be isolated from their surroundings and cease to be sources of infection.

The construction can be very light, as the buildings need only be open shelters with a good protecting roof which may even be of thatch, and an easily disinfected floor. With very little outlay such hospitals can be constructed for at least 50 beds.

This remedy, which might be of the greatest consequence in bringing on a decline in tuberculosis in India will become a total failure, even worse than no measure at all, if the treatment in these special hospitals is not in the hands of thoroughly trained doctors who have real experience in the treatment of the disease and who can bring relief, and even cure, to many cases formerly outside the scope of help. In this connection I can mention the value of pneumothorax treatment.

8. *Tuberculosis Dispensaries—their place in India as a later Link in the Campaign against Tuberculosis.*

It seems to have been financial considerations and at the same time the desire to have something done, which have led to the establishment of tuberculosis dispensaries in the principal cities of India before measures were taken to provide hospitals and sanatoria to which the detected cases could be advised to

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go for proper treatment. To have patients with fever continuing to attend a dispensary, often from long distances, is an irresponsible way of dealing with the question of treating and combating tuberculosis, and will easily result in discrediting the whole campaign.

In most of the Western countries the dispensary is used as a clearing station, a centre for diagnosis and for detecting infectious cases in the homes of the patients, but not as a treatment centre. It should not be forgotten that in the Edinburgh system with its strong emphasis on the value of dispensaries, these are considered as co-operating with sanatoria and hospitals. There were in 1922 in Scotland 31 approved dispensaries, while 104 sanatoria and hospitals with 3,711 beds were available for tubercular patients.

It has been a serious mistake that in India a campaign was attempted by establishing tuberculosis dispensaries in the larger cities when in the most of them there was not even a trace of a tuberculosis hospital, not to speak of sanatoria situated in suitable climates. Fortunately this state of affairs is beginning to be remedied by the construction of such hospitals, and by appointing to these hospitals doctors fully trained in the modern treatment of tuberculosis.

Besides being clearing stations, there is a great scope in dispensaries in India in the large cities for research work and prevention. From these centres the infection rate by the skin-reaction may be worked out as has been done in Madras, and work of this kind may also be done in schools to find out the centres of infection amongst the children. The detection of the sources of infection is all-important. In one of the quarters of New York with 80,373 inhabitants, 58.8 per cent. of all tuberculosis cases were found in only 10.5 per cent. of all the houses in that quarter. In Marburg (20) in Germany, 34.2 per cent. of the consumptives lived in 2.6 per cent. of the 1,503 houses. Such investigations are of the greatest importance, but can only be done from well-staffed dispensaries.

One of the questions of prevention which is now drawing much attention is the vaccination of new-born babies in tuberculous homes with Calmette's vaccine, as done in France. The whole question of creating immunity by vaccination ought to be investigated here in India, and the clinical side of such work must be carried out from well-staffed dispensaries and hospitals within the cities.

9. *Tuberculosis Colonies and the Aftercare of poor Ex-patients.*

In England, as elsewhere, tuberculosis colonies have been established in which different kinds of industrial work are provided for poor ex-patients not sufficiently ill to require further institutional treatment, but not strong enough to be able to earn their living were they to return to the conditions of ordinary hard village life or to the strenuous competition of life in the larger towns, where they often live under slum conditions. Another object(21) is to enable the families of such ex-patients to be brought up in the colonies in such a way that they may have a fair start in life and thus be less prone to succumb to infection.

At Madanapalle there has been established the small nucleus of such a colony, sufficiently large to prove that it is quite possible to have such colonies in India with successful results.

Such colonies can be established with very little capital expenditure close to towns and cities if constructed as open-air sheds. The chief point is, however, good management and proper medical supervision.

Nothing will more readily convince the public regarding the possibility of a real campaign against the disease than to see former patients, even more advanced cases without a total cure, able to support themselves and their families, living under hygienic and happy conditions.

10. *Education of the Public by a Tuberculosis Bureau created for this purpose.*

All measures instituted against the disease will have very litle power of bringing about a decline of tuberculosis in India if the public does not learn the infectious nature of the disease and how to protect itself against its spread.

The public in India has hardly any idea of the cause of the disease and therefore takes no precautions against contracting it when exposed to infection. It is a common belief that tuberculosis is inherited or else is due to bad climatic conditions. The fact is that we know now that children of tuberculous patients contract the disease less frequently, and those who do so suffer much less severely, than children who have not acquired immunity congenitally or by inheritance.(22) What constitutes the danger for children of tuberculous parents is living together with their parents and their being thereby exposed to massive infections through carelessness. The acquired immunity of the parents is a protection, if it is inherited.

The usual conception that a change of climate—even for only a few weeks—will suffice to solve all problems of tuberculosis in the family, is doing an enormous amount of harm, the more so as some doctors seem to be inclined to share this opinion, according to the advice given by them to many consumptives.

A campaign of education regarding the infectious nature of the disease and the necessity for early treatment is urgently required to stem the increase of tuberculosis in India.

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A definite press campaign ought to be arranged by a special tuberculosis bureau created for this purpose. This should also arrange lectures in colleges, schools, and through the subordinate officers of the health departments in industrial centres, and in such villages as are liable to infection by people returning from infected areas.

11. *Preventive Measures against the Spread of the disease from Industrial Centres to Rural Areas.*

In specially infected areas such as industrial centres, tuberculosis officers should be appointed. Their work should be to trace out all cases of tuberculosis in factories and the homes of the workers and advise about special precautions and measures to be taken. If there is found a certain incidence of infection in any particular industrial centre, a tuberculosis hospital should be established at the cost of the industry concerned, and run by a specialist to the satisfaction of the Government.

These tuberculosis officers should have subordinates in the areas from which the industrial population is drawn, and through them should keep track of all consumptives who return to their villages so that they may be cared for.

Such a special tuberculosis officer in the big cities might also be of the greatest help if his co-operation was secured in the different child-welfare schemes.

SUMMARY.

While there is a decline of tuberculosis in the West, there is an increase in India. This is due partly to an unfavourable climate and insanitary conditions, but it is not less due to the development of Western education and industrialism and increased facility of communication. The spread of the disease cannot be checked merely by general improvement of sanitary and social conditions, but the actual sources of infection must be sought out and dealt with.

The lines of attack followed in the West should be introduced systematically into India, as there are now sufficient proofs of their successful application to Indian conditions.

A beginning should be made by establishing at least one large sanatorium in each province in a place climatically suitable. These institutions should be centres for scientific research on the application of the various remedies and methods in the treatment of tuberculosis in Indian patients.

These sanatoria should further undertake the training of doctors and medical students in the principles of the modern treatment of the disease, as this training can only be satisfactorily given in such large special institutions.

The next development should be the establishing of smaller special tuberculosis hospitals of cheap and light construction outside larger towns. Larger special hospitals with research facilities should be constructed in the provincial capitals. These may also be used for the training of medical students.

Further tuberculosis dispensaries should not be established until some special provision has been made for institutional treatment of tubercular patients, and the dispensary should become chiefly a clearing station for diagnosis and a centre for detection of sources of infection in connection with research work in preventive measures.

Tuberculosis colonies for poor ex-patients should be established in connection with sanatoria and hospitals.

Education of the public regarding the infectious nature of the disease should be undertaken from a tuberculosis bureau established especially for this purpose.

Tuberculosis officers should be appointed in the industrial centres to combat the disease, not only in these, but also in the villages from which immigrants are chiefly drawn.

Only a beginning has been made in the application of our knowledge of tuberculosis to Indian conditions; but, although the task before us is almost overwhelming, we have already seen sufficient results to enable us to proceed with courage and determination against what has become one of the foremost scourges afflicting the millions of India.

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THE NEED FOR AN INDIGENOUS PROFESSION OF DENTAL SURGERY IN INDIA, WITH A BRIEF HISTORY OF THE EFFORTS TO MEET IT MADE UNDER THE AUSPICES OF THE MADRAS MEDICAL DEPARTMENT.

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THE sub-continent of British India is unique among civilized countries in that it has no indigenous profession of dental surgery. Yet the incidence of dental disease is as severe in its crowded populations as on the average of those of other parts of the earth, and there is consequently a widespread demand for dental treatment. This demand should be met by an *indigenous* profession of dental surgery.

There is in India—though natives of Canada, Norway, Japan, or Argentina, for example, might hardly credit it—no University-affiliated school for training dental surgeons, no recognized dental hospital where they may gain experience, and no registrable diploma conferred by Government.

As an instance of what other countries have had to do in this respect, we may take the case of Brazil. About 20 years ago the Brazilian Government, "obliged to take action against the importation of U. S. dentists," established a dental hospital and school, and instituted a diploma and the registration of its holders. And the reason they were obliged to was, presumably, that they might retain a remunerative profession in the hands of the Brazilians.

In India, under present conditions, young men and women of the educated classes are debarred from engaging in the honourable practice of what should be a remunerative profession unless, in order to acquire the necessary training, they are prepared to travel to remote countries and to reside abroad for several years.

Consequently, now that Great Britain prohibits unregistered practice, and all the Dominions and some of the Crown Colonies of the British Empire have protected themselves by Dental Acts, India is rapidly becoming the last of the happy hunting grounds left to inadequately qualified and irresponsible dental practitioners and quacks of all degrees.

It is proposed in this article to consider briefly this state of affairs, and incidentally to outline one of the attempts made to supply the deficiency; and, for the sake of clearness, to do so under the following heads:—

(1) *The Prevalence in India of Diseases of the Teeth, and the Need for Skilled Treatment thereof.*

(2) *The Existence of Public Services for the Official Practice, and, of Medical Acts to Control the Unofficial Practice, of Medicine and Allied Faculties, with the Conspicuous Exception of Dental Surgery.*

(3) *The Professorship of Dental Surgery in the Madras Medical College, and the Dental Department at the Madras General Hospital.*

(4) *The Instructions of the Madras Government to Prepare Schemes for a Dental School and Hospital, a Diploma, and Registration.*

(5) *The Miller Scheme, and Subsequent Modifications thereof.*

(6) *The Public Demand for Dental Training, and a Profession of Dental Surgery.*

(7) *The Post-Collegiate Course in Dental Surgery for Civil Assistant Surgeons, and Sub-Assistant Surgeons.*

(8) *The Royapuram Dental Hospital, and the Designs for a Dental Department in the Projected General Hospital at Egmore.*

(1) The prevalence of diseases of the teeth in the Presidencies and Principalities of India and Burma, and the necessity for scientific and skilled treatment of these diseases, both with regard to dental efficiency and relief of dental pain, and also to protection from bodily disease arising from neglect of disease of the teeth.

The teeth and jaws of the native races of India, Burma, and Ceylon, are of primitive type; that is to say, amongst the mass of the population the structure, form, and arrangement, of the teeth are unimpaired morphologically by the inherited effects of Western civilization. As compared with the teeth of European races, they are of more pronouncedly anthropoid type, bigger, stronger, and more thoroughly calcified, so much so, indeed, as to be under normal conditions almost immune to attack by dental caries.

One would think that amongst such people there would be very little liability to dental disease. Indeed, Europeans coming out to the East are generally struck by the bigness, whiteness, and apparent soundness of the teeth of the inhabitants.

The fact is however that amongst Oriental races, although dental caries, the scourge of the Occident, is comparatively rare, the teeth suffer from disabilities not less serious and rarely as widespread.

The weak point in the dental economy of Oriental peoples would seem to be the periosteal ligament interposed between the root of the tooth and its socket.

This periosteal ligament functions partly as a pad to withstand sudden pressures, stresses and strains sustained during the crushing of hard substances. It has been evolved in accordance with the primitive necessity of dealing with hard, tough, and uncooked foodstuffs. Under Indian conditions, and especially from the nature of the racial dietaries it has for ages been subjected only to the slighter work involved in masticating cooked vegetable foods and the more or less gentle pressures of "pan chewing," etc.

It necessarily suffers from the inherited effects of insufficient functioning, and is losing much of its natural opsonic resistance to the attacks of septic organisms. It has consequently become liable to be affected by a chronic inflammation, generally known as "pyorrhœa alveolaris," resulting in osteitis of the bony socket, by which the socket is gradually destroyed and excreted as pus, the tooth being eventually extruded by a process closely akin to ulceration.

This condition of alveolar pyorrhœa is very prevalent among vegetarian races, including the Chinese and Japanese. It leads to early loss of the teeth and is a frequent cause of many systemic disorders.

(For an account of pyorrhœa in India *vide* "Pyorrhœa Alveolaris from a Tropical Standpoint," *Ind. Med. Gaz.*, Oct. & Nov., 1908.)

Pyorrhœa may therefore be said to be the special disease to which the teeth of Orientals as such are liable.

India however is no longer immune from Western civilisation, and its effects are evidenced by change in habits, customs, and diet. These effects are particularly noticeable in the big towns. Change of diet, especially the increased consumption of flesh foods and alcohol, is mainly responsible for the introduction, especially into the crowded cities, of "dental caries," i.e., bacterial disintegration of the calcified tissues of the teeth, and for its considerable increase during the last quarter of a century or so.

Alveolar pyorrhœa and dental caries and their concomitants and sequelæ constitute the chief disorders to which the teeth are liable, which bring about their loss and which may give rise to general systemic infection, being a frequent cause of serious disease.

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So that, as things are now, we have to reckon and shall have to reckon increasingly in the future, with dental disease very similar to that obtaining elsewhere.

Moreover, besides all classes of Indians, there is the fairly large and ubiquitous European and Anglo-Indian population to be considered, both as dental patients and as prospective dental practitioners.

A matter of minor importance as compared to dental disease, by reason of its relative infrequency, is fracture of the jaw. In the big industrial centres particularly jaw fractures are always occurring. In a general hospital there is no provision, either of skill or equipment, for the mechanical treatment of such injuries. Simple fractures of the mandible are treated by ordinary bandages, and more complex cases by plaster bandaging or ligature of the fractured edges. These surgical methods, while sometimes suitable, and in rare instances the only possible treatment, are in most cases, both for temporary comfort and permanent cure, far inferior to the adaptation of splints, and may result for instance in imperfect union or bad alignment. The mechanical treatment of jaw injuries has become a matter for experts and can only be carried out in a properly equipped and staffed dental hospital, or by a qualified dental surgeon.

Consequently, there is as great a need in India as elsewhere for a regular and ethical profession of dental surgery to deal scientifically and technically with the prevention and treatment of dental disease and the efficient replacement of lost natural dentures. And the need being present, and indeed urgent, there has naturally arisen a strong demand for its satisfaction. Membership of an organized profession gives a practitioner a standard of ethics and a code of honour. Registration carries an obligation as to professional conduct, whilst a registered practitioner is under direct control as regards methods of practice. Under the present conditions in India, on the other hand, the qualified practitioner is penalized, and the practice of dentistry is thrown open to foreigners free from any authoritative control and untrammelled by a code of professional ethics, and to ignorant and irresponsible amateurs.

Owing to the prolonged inaction of Government, a large body of quack dental practitioners is already in existence, and attempts are being made to organize these irregulars into a "dental profession," and to issue certificates to them after a very inadequate course of training. The continuance of these attempts can only lead to abuses such as those said to be prevalent in certain states of the U. S. A., private dental "colleges," independent of the State university, being allowed to confer "degrees." In the States, however, the holders of such degrees are debarred from practice, and are merely "manufactured for export."

It has therefore become necessary to insist on the fact that a properly trained and qualified profession is required, and that prospective members of such a profession have a right to as high a standard of teaching and as high a professional status as that of the other liberal professions in this country, and as that offered in dental surgery to their nationals by other civilized countries.

The conclusion come to by the Departmental Committee of 1919 to enquire into the evils of dental practice in Great Britain by unqualified persons, and which resulted in the Dental Act of 1921, may here be quoted.

"In conclusion, we wish to state very strongly that, in our opinion, the State cannot afford to allow the health of the workers of the nation to be continuously undermined by dental neglect. Steps should be taken without delay to recognise dentistry as one of the chief, if not the chief, means for preventing ill-health, and every possible means should be employed for enlightening the public as to the need for conservative treatment of diseased teeth. The dental profession should be regarded as one of the outposts of preventive medicine, and as such encouraged and assisted by the State. Treatment should be rendered available for all needing it. The present anomalous position in which an uneducated, untrained person can practise as a dentist, performing surgical operations on the teeth and jaws, doing untold damage and casting undeserved odium and dishonour on a scientific profession, is intolerable, and should be dealt with immediately."

(2) The existence of Public Services for the official practice, and of Medical Acts to control the unofficial practice of Medicine and allied faculties, with the conspicuous exception of Dental Surgery.

Public Services have long been established in India for the practice of medicine, surgery, and several specialities of these, and more recently bio-chemistry, radiology, hygiene, and sanitation; Dental Surgery alone, of all the healing arts, being unprovided for by a public service or branch thereof, although in Great Britain we have lately seen the institution of a public medical service quickly followed by that of a public dental service.

Within recent years Medical Acts have come into operation to control and protect the private practice of medicine and surgery. Dental Surgery, perhaps most of all the scientific professions, needs effective control and protection, being, chiefly on account of its mechanical branch, particularly liable to exploitation by incompetent and unprincipled practitioners. Dental surgery however has unavoidably not been included under the Medical Acts there being at the time they were passed no Indian dental profession in existence, and of course no register of dental surgeons.

British qualified dentists practising in India naturally regard the exclusion of dental surgery from the scope of the Indian Medical Acts as an injustice to their profession. A provisional form of petition to Government was circulated amongst British-registered dentists in India early in 1915, asking for the registration of dental surgeons, and outlining suggestions for a Dental Act. It was considered however by some of the members of the profession that Government would be unlikely to introduce legislation with other than the following two objects in view—the guidance or protection of the public, and the creation or protection of an indigenous profession. It would seem that an essential part of any scheme for regulating dental practice in India would be the training of dental surgeons in the country and the granting of a diploma. Under any dental Act that might be passed all British Empire qualifications would doubtless be admitted to the Indian register, at any rate for a term of years. However this may be, the matter of the petition appears to have been dropped.

Efforts have been made from time to time by the Madras Medical Department to induce the Madras Government to meet the demand for dental service by the constitution of an organized dental profession. A brief account of these attempts and the Government attitude thereto follows.

For many years the response of Government did not go beyond the teaching of elementary dental surgery to medical students and the establishment of a dental department in connection with the Presidency General Hospital. Since the termination of the War selected Civil Assistant Surgeons have been given a short period of training in this dental department, and put in charge of dental clinics at certain Headquarters Hospitals in the Districts of the Presidency.

Their repeated instructions for the drawing up of reports and estimates indicate however that Government really did appreciate the desirability of the creation of a properly trained and regularized profession.

(3) The Professorship of Dental Surgery in the Madras Medical College and the Dental Department at the Madras General Hospital.

The chair of Dental Surgery, under the Madras Educational Department, was inaugurated in 1883, and in 1888 a clinic was started at the General Hospital for the practical instruction of students in the minor operations of dental surgery. A department of the General Hospital for the treatment of dental patients was thus constituted.

Lectures on dental anatomy and surgery were delivered in the College, attendance at which was compulsory for military pupils and apothecary students,

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and optional for others. The Dental Department of the Hospital was open on three mornings in the week during the session of the College, when the Professor of Dental Surgery attended for the teaching of students and the treatment of patients. The patients were drawn from all the poorer classes of Madras, and in August, 1899, soldiers from the Station Hospitals were admitted for treatment.

The dental department was lodged in one room at the hospital, the subordinate staff consisting of one ward-boy. No records were kept until the end of 1894. The annual number of patients increased from 900 in 1895 to an average of about 2,200 in 1916 and 1917. In July, 1918, a second dental surgeon was appointed and from that time the annual number of admissions steadily increased until in the years 1922, 1923, and 1924, the average annual admissions reached 4,585.

The treatment carried out was mainly extraction (for dental caries, and its sequelæ, impacted lower third molars, and pyorrhœa alveolaris), and scaling. From 60 to 100 fillings were done each year, an occasional Hammond splint fixed, and a few simple regulation cases and so on undertaken, besides the treatment of gingivitis, ulceration, etc. After the appointment of a second dental surgeon the yearly average of fillings rose to about 140.

In 1906, the regular administration of ethyl chloride as a general anæsthetic was commenced, chloroform having previously been given for multiple extractions of carious teeth, mostly required for British soldiers. From then until the end of 1924, ethyl chloride was administered for 3,230 operations, without accident, a special anæsthetist being appointed to the dental department in 1923. The ethyl chloride and ether sequence, and chloroform, were also occasionally administered, and cocaine was employed as a local anæsthetic.

The years 1910 to 1912 saw the transference of the control of medical education from the Educational to the Medical Department, the inclusion in the dental surgery classes of the L.M. & S. and M.B., B.S. students and the reduction of the course of lectures on dental surgery from about 30 meetings to 15. At the same time as the last change the practical teaching was regularized, each member of the College dental surgery class being required to attend the dental room at the Hospital on at least 15 days. The Professor's recommendation had been a minimum of 12 attendances per month during 3 months.

During the War proposals were made through the Superintendent of the General Hospital for the regular inspection and treatment of the men of the Indian Defence Force, the dental department to be kept open for this purpose daily throughout the year if necessary, but these proposals did not meet with the approval of the Military Authorities.

(4) The Instructions of the Madras Government to officers of the Madras Medical Department to draw up schemes and prepare estimates for the establishment of a dental school and hospital, the institution of a dental diploma, and registration of dental surgeons.

As early as July, 1888, Surgeon-General Bidie, in a memorandum to the Madras Government, expressed the opinion that the profession of dental surgery was one "in which the natives of this country would be likely to excel if put through the usual course of training and tuition adopted in England," and he suggested that "in the case of dentistry being regularly taught as a profession, it will be necessary for the University to arrange to grant a licence to men who qualify."

In the reply of Government to this memorandum, dated 30th August, 1888 (nearly 39 years ago), they "approve of the University being invited to establish a degree of licentiate in the subject." Nothing, however, appears to have been done.

In 1906 the first serious effort was made to grapple with this question, and in 1907, 1908, and 1909, schemes were prepared and submitted to Government for the institution of a dental school and hospital and the granting of diplomas in dental surgery.

The final scheme proposed was more or less in the nature of an experiment, and—as was hoped—preparatory to the granting of a licence to practise and the registration of practitioners by the Government of India.

Two curricula were suggested; one for a full course in dental surgery, and one, with a two years' course, for the holder of a medical diploma, to be termed provisionally "Licentiateship in Oral Surgery," on similar lines to the licentiateship in Sanitary Science.

Estimates were drawn up in detail of cost of equipment of hospital and school, provision for staff, etc.

The scheme, with comments by the Director of Public Instruction, the Principal of the Medical College, and members of the College Council, is set forth in G.O. No. 368, 22nd June, 1909. It appears to have been turned down by Government without further comment.

Proposals for the establishment of a dental school and hospital have also from time to time been submitted to Government by the Medical Departments of Bengal and Bombay. In reply to enquiries the Inspector-General of Civil Hospitals, Bengal, wrote in August, 1913, "A proposal to establish a dental hospital and school in Calcutta was submitted for the sanction of Government in 1908, but, as Government rejected it, everything ended there."

(5) The Miller Scheme, and subsequent modifications thereof.

A further determined effort was made in Madras towards the end of 1918 by the Surgeon-General to direct the attention of Government to the important matter of dental training, and Lieut.-Col. A. Miller, I.M.S., Principal of the Medical College, was instructed to draw up a scheme in consultation with the Professor of Dental Surgery.

The idea was to develop a dental department in connection with the Medical College for the training and licensing of dental surgeons as soon as possible after the War, and the proposals were forwarded to the Government of Madras through the Surgeon-General on the 3rd October, 1918. By the date of the occupation of Cambrai they were in the hands of Government.

The report mentioned the fact that the importance of dental surgery was then so well recognized in Great Britain that the larger medical schools either had dental schools of their own (e.g., Guy's and London), or had working arrangements with dental hospitals so that patients might easily be sent for dental treatment; also that there was no dental school at all in India. It referred to the advantage it would be to turn out qualified dental surgeons before dental quackery had time to become thoroughly established, so keeping open a clear field for the development of dental surgery without the drawbacks which had attended the development of scientific medicine in this country.

The outlines of the scheme were as follows:—

1. COURSE AND DIPLOMA.

In Great Britain the course for a College of Surgeons Licentiateship extends over 4 years, and that for a University Degree over 5 years. It was therefore recommended that a 4 years' course be prescribed, and that the Faculty of Medicine be moved to ask the University to institute a Licentiateship in Dental Surgery.

2. GENERAL EDUCATIONAL QUALIFICATION.

The same as that required for the M.B., B.S. or L.M. & S., *viz.*, the Intermediate Examination in Arts of Madras University, or any examination recognized by the General Medical Council of the United Kingdom.

3. LICENTIATESHIP IN DENTAL SURGERY.

Details of the Course.

1st Year.

Chemistry. A special syllabus to be arranged, including inorganic and organic chemistry.

Physics. The same course as for the 1st M.B., B.S.

Dental mechanics and laboratory work.

Dental hospital practice. After the first six months.

2nd Year.

Dental materia medica.

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Dental mechanics.
Dental metallurgy.
Laboratory work in dental mechanics.
Dental anatomy and physiology.
Dental hospital practice.

3rd Year.

Anatomy. Lectures and dissections (head and neck and one other part).
Physiology. Same lectures as for the M.B., B.S.
Dental hospital practice.
Clinical surgery at a General Hospital.
Dental histology.
Dental anatomy and physiology.
Practical histology.

4th Year.

Surgery.
Clinical surgery and pathology at a General Hospital.
Dental hospital practice.
Dental pathology, surgery and prosthetics.
Operative dental surgery. Lectures and demonstrations.
Dental bacteriology.
Anæsthetics.

EXAMINATIONS.

After 1st Year.	Physics. Chemistry.
„ 2nd „	Dental metallurgy.
	Dental materia medica.
„ 3rd „	Physiology and histology.
	Dental anatomy, histology and physiology.
	Dental mechanics.
„ 4th „	Surgery.
	Dental Surgery, including prosthetics.
	Operative dental surgery and anæsthetics.
	Dental pathology and bacteriology.
	Dental therapeutics.

STAFF.

(1) Demonstrator of Dental Mechanics and Curator of Laboratory.
Laboratory Assistant.
(2) Two Dental Surgeons, Professors of the specially dental subjects.
Two Assistant Dental Surgeons, Assistant Professors.
(3) Nurses.
(4) Menial Staff.

The Dental Surgeons to have a position similar to I.M.S. Officers. At first one senior and one junior dental surgeon to be appointed, and the staff increased as required. The Assistant Dental Surgeons to be graded like Civil Assistant Surgeons.

The following subjects to be taken by the ordinary staff of the Medical College:—Chemistry, Physics, Dental Metallurgy, Anatomy, Physiology, Histology, Dental Materia Medica, Surgery, Clinical Surgery, Pathology, Dental Bacteriology.

STUDENTS' FEES.

The fees in Great Britain (e.g., London Hospital Dental School) for a 4 years' course are higher than the fees for a 5 years' medical course. This is due to the 2 years' course in dental mechanics, in which a considerable amount of material has to be used. The fees in Madras might be made the same as for the Medical School. Dental students would be put to less total expense in that the course occupies 4 instead of 5 years. Registration and Athletic Club fees to be the same as for medical students.

4. CERTIFICATE IN DENTISTRY.

(A subsequent modification of the Miller Scheme.) A shorter course, on the lines of the Sub-Assistant course in medicine and surgery, to qualify men for work in district hospitals, etc. This course to be a modification of the Licentiateship course, to take 2 or 3 years.

Both classes of students could be accommodated in the same buildings, the general subjects being taught at the Medical College.

In November, 1920, estimates were called for of buildings required, cost of appliances, materials, etc.; and a complete estimate of requirements and of the cost of special dental fittings, instruments and materials submitted.

In May, 1922, after further consideration of the scheme, the Surgeon-General stated that, as the dental school could not be made self-supporting, the scheme had to be shelved for the time being. At about the same time the Surgeon-General with the Bombay Government stated that the details regarding the establishment of a dental school at Bombay had not been worked out, as the project had been withheld owing to financial stringency.

In December of the same year, however, the estimates were again called for by the Madras Government, and again worked out in detail, giving the latest prices of the most modern requirements, so far as was compatible with the strictest economy. Particulars of the cost of buildings, or of adapting existing buildings, fittings for water-supply, electric installation, etc., were to be supplied by the P. W. D.

In July, 1923, the whole scheme was thoroughly reconsidered by the Surgeon-General, the personnel and salaries of the staff, etc., provisionally settled, and the papers finally laid before Government.

A Government Order issued on 8th September, 1923, states, "The Government consider that the scheme for opening a dental school and hospital in Madras should be taken up along with the scheme for the new General Hospital."

(6) The Public demand for dental training and for a profession of dental surgery.

A Government Memo. dated 4th February, 1920, had called for definite information as to the demand for a dental school or for dental surgeons in Madras City or the Districts.

Accordingly a letter was circulated to medical practitioners, the heads of colleges and others, asking for a statement of their views as to (1) the need for dental surgeons, and (2) the demand that exists for a dental school.

About 30 letters were sent out, and 23 replies were received and laid before Government. They showed that a very considerable demand for dental surgeons existed in the Presidency, and that there would not be much difficulty in getting candidates for dental training.

A list of applications for teaching in dentistry, with letters from the applicants, was also furnished.

The demand for dental treatment is also shown by the considerable number of men who have had a short period of training under unregistered practitioners, or who have served as dental mechanics, and are now practising for themselves in Madras city, where there are numbers of ignorant people engaged in supplying unskilfully made artificial teeth.

(7) The Post-Collegiate Course in Dental Surgery for Civil Assistant Surgeons and Sub-Assistant Surgeons.

In May, 1920, at the urgent request of the district authorities for a dental service, a six-months' post-collegiate course in dental surgery was started at the Madras Medical College, for the training of medical subordinates to be put in charge of dental clinics at the district headquarters hospitals of the Presidency.

The course consisted of daily attendances in the dental room of the General Hospital for observation and practice, demonstrations, and a course of 15 lectures on dental surgery and 5 on anæsthetics, the teaching staff consisting of the Professor of Dental Surgery, the Second Dental Surgeon, and an Instructor in Anæsthetics. Special demonstrations were given of impression-taking, model-casting, and the construction of Hammond splints.

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Four Civil Assistant Surgeons and 1 Sub-Assistant Surgeon were trained in 1920, and the course was repeated in 1921, when 3 Civil Assistant Surgeons, 1 Sub-Assistant Surgeon, and 1 private pupil, were trained.

The holding of these courses led to an increase in the number of patients treated at the hospital, and to a good deal more conservative work being undertaken.

It also brought the dental department more into line with regular dental hospitals, in that a considerable proportion of the work could be done by the students themselves, which was of course out of the question before the special course was started.

It would, in fact, have constituted a useful nucleus for later expansion into a dental school. However, the course was discontinued in 1922, and in June, 1923 Government issued an order stating that "Only two courses of training have been held so far, and the scheme is now held in abeyance on account of the present financial stringency."

The officers having been trained and posted to the various hospitals, it became necessary to provide them with dental furniture, apparatus, and materials.

Dental chairs, to designs requiring only carpenter's and very simple blacksmith's work, were constructed at the Madras Central Jail, and supplied to the head-quarters hospitals, together with the minimum requirements in the way of dental apparatus, instruments, and materials and by the end of 1922 six dental clinics, to start with, were established.

(8) The Royapuram Dental Hospital, and the designs for a Dental Department in the projected General Hospital at Egmore.

Owing to the accommodation available at the Government General Hospital having become inadequate to the increasing scope of the work of the department for the treatment of dental disease, this department by order of the Surgeon-General dated 24th March, 1924, was transferred from the General Hospital to the recently erected buildings of the Government Royapuram Hospital.

The premises allotted to the new dental department comprised a modern hygienic operating room, well-lighted, with adequate water-supply and electric installation, a second room for the examination of patients and use as office, etc., a retiring room for female patients, and male and female waiting-rooms with lavatories. Three oil-pump chairs of the latest patterns were installed, with a corresponding equipment of dental engines and other instruments and appliances.

The premises were self-contained, and the department could now be described as a Dental Hospital, albeit on a small scale. The Staff consisted of the Professor of Dental Surgery, Medical College, as First Dental Surgeon, the Second Dental Surgeon, and the Dental Anæsthetist. The services of nurses and peons were provided by the Superintendent of the Royapuram Hospital.

The department was opened for the reception of patients on 9th April, 1924, and in a few months the number of admissions had about reached the level attained before the change.

This change to more up-to-date premises had been originally intended to be provided for by the projected new buildings for the Madras Government Hospital, and in connection with this scheme, the Government Architect designed a dental department to the requirements indicated by the Professor of Dental Surgery. The designs were being discussed about the time that the Miller scheme was mooted, and provided for what was intended to be a more efficient General Hospital Dental Department with facilities for expansion when necessary.

They comprised a conservation room accommodating from 12 to 15 chairs, extraction and anæsthetic rooms, offices, dental laboratory, waiting rooms, etc.; as this was regarded as sufficient provision, during the first few years at least, for a dental hospital such as would be required under the Miller scheme.

The department was to be self-contained, occupying the upper storey of a wing of the Out-patient Department, and was to have its own entrance hall and exits.

At one time there seemed to be a possibility of the building of this Out-patient Department being pushed on as a matter of urgency, and it was when this prospect had definitely faded that the provision was made at Royapuram.

(9) The collapse of the whole project—dental hospital, dental school, diploma, and registration.

The scheme seemed to be at last on the eve of fruition, when the G.O. of the 8th September, 1923, was issued, deferring the question of opening a dental school and hospital at Madras for consideration along with the scheme for a new General Hospital.

The last-mentioned undertaking was first mooted in 1909, and, after many vicissitudes, appeared to be postponed indefinitely; so there seemed but little prospect of anything being done in the near future for dental education or organization in Madras.

Similar efforts in the other Presidencies have apparently met with a like fate, and the chief hope would now seem to lie in the possibility of inducing the Government of India to inaugurate a scheme for the whole Empire and bring in a bill on the lines of the Dentists' Act (Great Britain) of 1921, the model on which other dental acts in the Colonies are now being framed. This would of course be a much simpler matter if dental schools and hospitals had already been started in the Presidency towns. In any case, before such an Act could come into operation, schools affiliated to the Universities and hospitals would have to be established.

There may still be a chance of something of the kind happening, as signs of activity are again evident in Calcutta and Bombay, and quite lately a statement has appeared in the press that the Madras General Hospital scheme has been revived as a plan for re-building the General Hospital on the present site. If the scheme should this time materialize, it is to be hoped that the dental department will not be lost sight of.

Current Topics.

D. T. M. (Bengal). Pass List. 1927.

AT the examination held in April 1927 at the Calcutta School of Tropical Medicine for the Diploma in Tropical Medicine of the Faculty of Tropical Medicine, Bengal, the following 25 out of 40 candidates were successful.

Passed with Distinction.

Miss E. I. Hamilton-Browne, M.B., ch.M. (Sydney), Superintendent, Lady Dufferin Hospital, Calcutta.

Passed.

L. S. Ramchandra Aiyar, M.B., B.S., B.SC., District Health Officer, Madras.

Janranjan Bondyopadhya, M.B. (Calcutta), Assistant Surgeon under the Bengal Government.

Abilas Chandra Basu, M.B. (Calcutta), Physician to the Mahisadal Raj.

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Mahabir Prasad Bhatnagar, L.M.P. (Agra), Private practitioner, Rampur State.

Military Assistant Surgeon A. G. Brooks, British Military Hospital, Bareilly.

Sachi Kumar Chatterjee, M.B. (Calcutta), Private practitioner, Calcutta.

Military Assistant Surgeon F. P. Gilson, British Station Hospital, Alipore

John Alumottil George, L.M.S. (Madras), District Health Officer, Kurnool.

Nalinendra Kishore Ghosh, M.B. (Calcutta), Private practitioner, Silchar, Assam.

Miss M. J. Giffard, M.B. (Rush Medical College, Chicago), Mission Hospital, Gauhati, Assam.

Ananta Kumar Guha, L.M.F., Sub-assistant Surgeon under the Government of Bengal.

Upendra Mohan Gupta, M.B. (Calcutta), Civil Assistant Surgeon in charge, Pilgrim Hospital, Puri, B. & O.

Aditya Kinkar Hazra, M.B., B.S. (Bombay), Private practitioner.

Military Assistant Surgeon C. E. Hynes, Quarantine Medical Officer, Bushire, Persian Gulf.

Military Assistant Surgeon J. W. Meyers, British Station Hospital, Calcutta.

Romapathi Mukherji, M.B. (Calcutta), Private practitioner.

Augustine Paes, M.B., B.S. (Bombay), Private practitioner, Nova Goa.

Kandaswami Pillai, L.M.P., Sub-assistant Surgeon, Government Ophthalmic Hospital, Madras.

C. N. Venkoba Rao, L.M. & S. (Madras), District Health Officer, Anantapur.

Jibakanta Saikia, M.B. (Calcutta), Private practitioner.

Suprakas Sen Gupta, M.B. (Calcutta), Private practitioner.

Suraj Narain, L.M.P. (Agra), L.T.M. (Bengal), Sub-assistant Surgeon, Pathologist, Victoria Hospital, Ajmere.

B. Laxmishankar Trivedi, M.B., B.S. (Bombay), Private practitioner.

Miss N. E. Trouton, M.B., B.S. (London), Women's Medical Service, India.

* * * * * * * *

The above list indicates how widespread are the sources from which students at the Calcutta School of Tropical Medicine are drawn. Had the suggestion—which was once put forward—to admit only those who are registered under the General Medical Council of the United Kingdom been adopted, the four military assistant surgeons and three sub-assistant surgeons in the above list could not have been admitted to the examination. The second place in order of merit was held by a military assistant surgeon, and the third by a sub-assistant surgeon.

In order to pass the examination candidates have to secure 50 per cent. of marks in each of the following:

(a) the combined paper in tropical medicine and hygiene.

(b) the combined paper in bacteriology, pathology, protozoology, and helminthology.

(c) the combined paper in pharmacology, tropical surgery, entomology, and serology.

(d) the practical examination in tropical medicine.

(e) the practical examination in bacteriology, pathology, and helminthology.

(f) the practical examination in protozoology.

(g) the practical examination in entomology;

Whilst—in addition—a total of 75 per cent. of marks in the examination is required for distinction.

Blackwater Fever in London.

A CRITICAL STUDY.

By PHILIP MANSON-BAHR, D.S.O., M.D. (Cantab.), F.R.C.P. (Lond.),

and

EDWARD G. SAYERS, M.B., Ch.B. (N.Z.).

(*Lancet*. Feb. 1927, p. 273.)

THIS paper consists of an analysis of fourteen cases of blackwater fever which have developed in London during the last seven years. All the patients came from Africa, especially the West Coast, where the subtertian form of malaria predominates. The length of stay in the endemic area varied from one to five years, the average time being 3.2 years. In no case did blackwater occur after *ten weeks'* residence in England, the average time being four weeks. The re-acclimatisation period is the period of danger. A previous alcoholic history plays little or no part as a precipitating factor. The mortality in the series was exactly 50 per cent. In two instances there was a history of previous attacks of hæmoglobinuria.

In every case the patient came from an area which has been abundantly proved to be an endemic focus of subtertian malaria. A *clinical history of subtertian malaria* was present in every case; that is to say low fever accompanied by bilious vomiting and general malaise, and that general subicteric tinge of the skin and sclerotics which stamps the malarial cachectic. *Parasite findings.* Subtertian malaria parasites in the ring stage were demonstrated in 50 per cent. of the cases. One patient was given at 7-45 p.m. 10 grs. of quinine, after which she spent a comfortable night until 2 a.m. when she woke up vomiting bile-stained fluid. At 5 a.m. she had a rigor with a temperature of 101°F. and passed blood stained urine; by 10 a.m. she was deeply jaundiced. It is difficult to escape the inference that quinine precipitated this attack of blackwater.

In one case the onset was distinctly traceable to a thorough drenching while fishing. Typical pre-blackwater symptoms are low fever, nausea and vomiting, anæmia, persistent headache, constipation, general malaise, sometimes rigors. The spleen is enlarged and painful, and sometimes the liver as well. The urine before the attack shows a trace of albumin and urobilin. In some cases no pre-blackwater condition can be recognised.

The pyrexia and rigors do not seem to be due to the effect of the malaria parasites, as few or none of these organisms can be demonstrated and the temperature is entirely unaffected by quinine.

The Spleen.—Attention was paid to the condition of the spleen in 12 cases. In each it was enlarged and tender, usually reaching to the umbilicus. The liver was enlarged and tender in six cases, usually two fingers' breadth below the costal margin.

Duration of Hæmoglobinuria.—This varies considerably. In cases which either recovered, or died after hæmoglobinuria had ceased, the shortest time was 24 hours and the longest four days. The average duration was 2.8 days. In one case the urine cleared after two days, remained clear for two days, and was again pink for 24 hours. In the series of cases suppression of urine was not a marked feature. One case had absolute suppression for 30 hours, but recovered entirely from the urinary condition, only to die later of pneumonia. None of the cases died of suppression of urine. One died of septic parotitis following blackwater fever, one of acute cardiac failure, four of acute hæmolysis, and one of pneumonia. Those who died of acute hæmolysis were cases of blackwater fever of a fulminating character, and death supervened in two within 14 hours of the onset.

The Symptomatology of Infection with *Entamoeba Histolytica* in Carriers.

By CHARLES F. CRAIG, M.D.

(*Journ. Amer. Med. Assn.*, Jan. 1, 1927, p. 19.)

EXPERIENCE has shown that more than 50 per cent. of so-called carriers of this parasite present some symptoms apparently caused by its presence in the intestine, and it is probable that a much larger proportion than this will be found, on careful inquiry, to present some clinical evidence of the infection. It is most unfortunte that the term "amœbic dysentery" should have become, in the minds of most medical men, a synonym of "amœbiasis" or amœbic infection; for while dysenteric symptoms are characteristic of the most serious cases of infection with *Entamœba histolytica*,

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the vast majority of such infections are not accompanied by dysenteric symptoms, but by much milder symptoms generally attributed to some other factor and not recognized as the result of infection with this parasite. Where one case of amœbic dysentery occurs, there occur many cases of amœbic diarrhœa, characterized by short periods of mild diarrhœa alternating with periods of slight constipation. Such patients, if they present themselves to a physician for treatment, are not suspected of suffering from infection with *Entamœba histolytica*.

The symptoms most frequently noted are those connected with the digestive system, and perhaps the most common of these are constipation and diarrhœa. Most carriers state that they are troubled more or less with constipation, relieved at times by mild attacks of diarrhœa, rarely lasting more than a day or two, at most.

If the fæces passed at the time of the diarrhœal attack are examined, it will be found that much mucus is present, and there may be blood microscopically, although this is rare. Motile, as well as precystic and cystic forms of *Entamœba histolytica* are invariably present in the diarrhœal stool.

These attacks do not occur frequently, perhaps only one or two occurring during a period of several weeks or months, and the blame is usually placed on some indiscretion in diet.

Another very common symptom noted in carriers of *Entamœba histolytica* is lack of appetite or actual anorexia. Many of these persons state that they have little appetite, that they eat because they feel that they should, but that they do not enjoy their food.

Along with this lack of appetite, or distaste for food, goes a loss in weight, which is quite characteristic of infection with this parasite. Most carriers will be found to be below normal in weight, and it will be found, on inquiry, that the loss in weight is most marked at times when the appetite is poor and the food is distasteful.

Other symptoms connected with the digestive system which are often noted in carriers of *Entamœba histolytica* are evanescent neuralgic pains in the lower portion of the abdomen, especially in the right iliac region; tenderness on deep pressure in the right iliac region and over the descending colon; a dull aching sensation in the lower abdomen; flatulence and distention of the abdomen, and tenderness at times over the region of the liver, leading, in some instances, to an examination, and a tentative diagnosis of hepatitis or cholecystitis.

A mild degree of anæmia is usually present in carriers of this parasite and is evidenced by the slight pallor so often noted in this class of persons. If a blood count is made, it will be found that the erythrocyte count varies between 4,000,000 and 4,500,000 erythrocytes per cubic millimetre while the hæmoglobin averages from 10 to 15 points below normal.

Many carriers of *Entamœba histolytica* present symptoms referable to the nervous system, all of them of the neurasthenic type. Of these, the most common are slight headache, occurring at irregular intervals and without any demonstrable cause; neuralgic pains in the head, arms and legs; dulness and lack of interest in the daily work; lack of initiative and ambition; poor memory; nervous irritability; sleepiness and disturbed sleep; irritable pulse, which increases in rapidity after the slightest exertion or nervous excitement, and excessive perspiration of the palms of the hands and soles of the feet. These symptoms, essentially neurasthenic in character, indicate the absorption of toxic material from the intestine, and are frequently noted in these persons.

Entamœba histolytica is usually a true tissue parasite, living on the tissue of its host, man. Therefore it follows that, strictly speaking, there is no such thing as a perfectly healthy carrier of this parasite, for if amœbas are present and multiplying, lesions have been produced in the mucous membrane of the large intestine, the natural habitat of this species. Fortunately, most persons are very resistant to the infection, and many hundreds and even thousands of the parasites may be present in such persons without producing notable symptoms of the infection. However, it should be remembered that many of these amœbas have penetrated into the mucous membrane of the intestine, producing lesions of the epithelial coat, and that these lesions, although microscopic in size and quickly healing, have undoubtedly allowed the entrance of toxic material and bacteria from the lumen of the intestine, with consequent liability of absorption through the lymphatics and blood stream. In resistant persons, healing of these minute lesions probably occurs rapidly and symptoms do not develop; but where resistance is lowered, healing is delayed and symptoms due to the absorption of toxins and bacteria occur. If one accepts 3 microns as the optimum length of *Bacillus coli* and 25 microns as the average diameter of the trophozoites of *Entamœba histolytica*, it is obvious that the lesion made by the latter organism in penetrating the mucous membrane of the intestine will be large enough to allow of the entrance of multitudes of colon bacilli, as well as streptococci, staphylococci and other inhabitants of the intestine, while considerable amounts of toxic material could be absorbed from even so minute a lesion.

Many carriers of *Entamœba histolytica* have macroscopic ulcers in the large intestine, for definite ulceration due to this parasite may exist in the intestine without the production of dysenteric symptoms, as first shown by Musgrave in 1910 who summarized the results observed at necropsy in fifty persons dying from other conditions than amœbic dysentery, and in whom amœbic infection was not accompanied by diarrhœa or other suspicious symptoms of dysentery. Regarding the lesions present in the intestine in these cases he says:—

Characteristic amœbic lesions were present at autopsy in all of the fifty cases. These lesions varied in type from those just beginning to those showing ulcers having the characteristic extensive destruction of the mucous membrane of the bowel so often seen in cases of amœbiasis of long standing. . . . . The duration of the infection, judging from the autopsy findings, varied, but in most instances the lesions indicated processes of long standing.

Dr. Craig urges the importance of a routine microscropic examination of the fæces in all patients presenting the symptoms noted in this contribution, and, if *Entamœba histolytica* is found to be present, the energetic treatment of the infection.

Giardiasis in Children.

By JOHN ZAHORSKY, M.D.,
and
MARY McLOON, M.D.

(*Journ. Amer. Med. Assn.*, Feb. 5, 1927, p. 383.)

REGINALD MILLER states that chronic enteritis due to *Lamblia intestinalis* in children may produce a slight deficiency in growth. The abdomen is often prominent but the general nutrition usually remains fair. The stools show, in addition to the lamblia cysts, much undigested food and mucus, without traces of blood. The amount of fat in the fæces may be above normal, but does not rise to the figures found in the diarrhœic type of cœliac disease. Miller then briefly reports two cases of chronic diarrhœa in children which were mistaken for cœliac disease but proved to be giardiasis.

In another article the same author gives a comprehensive review of the studies of giardiasis in children in England, and from a study of twenty-three cases he concludes that the infection is by no means rare, that it produces a chronic enteritis, and that the resultant diarrhœa is often severe enough to retard growth and development. True carriers even in children may be found infected with giardiæ but without symptoms.

Giardiasis does not have any characteristic symptoms. A persistent looseness of the bowel, some intestinal pain and discomfort, and lack of proper growth should lead

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the physician to examine the stool microscopically. The cysts are readily seen, but unless one is familiar with the microscopic picture, the diagnosis will be in doubt. The vegetative forms occur less frequently, but when once seen are very characteristic and cannot be mistaken for anything else. It is gratifying to know that when one has become familiar with the appearance of the cysts, the diagnosis is easy.

Wenyon tried emetine, betanaphthol, bismuth salicylate, and turpentine. He found that the best results followed the administration of bismuth salicylate. Arsphenamine, intravenously, has been recommended. The authors followed Wenyon's suggestion and gave bismuth salicylate. In all three cases there was a prompt disappearance of the cysts, and the gastro-intestinal and nutritional symptoms improved. As this drug is relatively harmless and may be administered repeatedly, there should not be any great difficulty in keeping this parasite from doing harm. Further observation is necessary to ascertain whether the child's intestinal canal can be permanently cleansed of all giardiæ by means of this drug.

The Treatment of Tuberculosis. By Spahlinger's Methods.

By THOMAS NELSON, B.M., B.ch. (Oxon.), M.R.C.P. (Lond.).

(*Lancet*, Jan. 1, 1927, p. 16.)

THIS note deals with a most careful and full record of ten cases treated under the immediate supervision of Mr. Spahlinger himself between November, 1913, and August, 1914. This work took place in a London teaching hospital under conditions ideal for research. It was under the supervision and with the cooperation of a very learned and wise physician whose opinion on such a matter would carry almost universal conviction. During this period the late Dr. Arthur Latham gave these selected cases as a test for Mr. Spahlinger. The treatment was carried out personally by Dr. J. W. Linnell, with Mr. Spahlinger actually at his elbow. Dr. Linnell was at that time working with Dr. Latham as Gibbons Research Student. The usual precautions were taken to explain the experimental nature of the treatment to the patients concerned (and to the parents of the younger ones). The choice of having the treatment or not was left to the patient's own inclination.

These cases were selected by Dr. Latham with the utmost care and skill. They were all (with one possible exception) of rather advanced chronic type, not immediately and absolutely hopeless. So that although few in number, they are the sort of cases in which an arrest of the disease with a return to reasonable health and life on the part of several of them would have indicated the presence of a curative agent in Mr. Spahlinger's preparation of such a nature as we have at present no knowledge.

They may be shortly reviewed thus. The case of lupus is still alive. Lung lesions are notoriously benign, as a rule, in individuals with lupus. The spinal case is untraced, but may possibly be alive—such cases do live for years. One of the lung cases is untraced. Of the remaining seven all are dead. It is difficult to say that any of them showed any improvement after their treatment; certainly none showed marked improvement. Such slight indications as there are of improvement are not more than one would expect from tuberculous patients after they had been in bed for periods of time such as these were. The two who lived to 1917 both had much further orthodox treatment at the Brompton Hospital, Frimley, and Ventnor. The one who died in 1921 is one of those cases to be found in any tuberculous series who live longer than one would expect. Also he was the patient in this series with the least disease and the shortest history.

Serum Prophylaxis in Measles.

By A. NEAVE KINGSBURY, M.B., B.S. (Lond.), D.T.M. & H.

(*Lancet*, Jan. 1, 1927, p. 7.)

THE author has recently attempted the control of an epidemic of measles on rubber estates in the Federated Malay States by inoculation of the children en masse with serum from convalescent cases, but some months after a number of plantation outbreaks had thus been brought to a close, morbilli reappeared on three of the seven estates on which serum prophylaxis had been practised. Comparatively little is yet known of the degree and duration of the passive immunity conferred by this mode of protection, and therefore some observations on these points are recorded in the present paper.

Immediate Results of Serum Prophylaxis.

The immediate results achieved with 395 children are summarised below. Groups numbering 93, 132, 50, and 120 children were given 2, 2.5, 3, and 3.5 c.cm. of serum respectively. During the seven weeks following inoculation the incidence in these groups was 15 per cent., 4.5 per cent., 14 per cent., and 1 per cent. Cases continued among adults and uninoculated children after the last cases in the inoculated groups on all the estates, so that opportunity for infection was not lacking. Yet there were not more than 28 cases among the 395 children, and only six of these developed the rash after an interval of ten days had elapsed from the date of inoculation.

The introduction of serum prophylaxis was followed by the observation of a striking modification in the course of the disease when such treatment was given in the later stages of incubation. Under these circumstances the malady is not aborted, but the incubation period may be increased, and the character of the disease is rendered so mild that complications and serious sequelæ are but rarely seen. Attenuation has also been noted in the few instances of the present series, where serum, although given some time before infection, failed to protect, and the rash developed three weeks or more after inoculation.

Of the 28 cases which developed measles within seven weeks of treatment, all but one of the children had very mild attacks. The exception was a child aged 3 years, on whom the rash appeared seven days after the injection of 2 c.cm. of plasma. Broncho-pneumonia supervened, but the course was comparatively benign, and the little patient was discharged from hospital 14 days after admission. A contributing cause of this complication was probably the migration of ascaris larvæ through the lungs. On two control estates 13 children had serious complications, and six died among 69 cases.

The cases of modified measles observed by the writer have been characterised by a comparative absence of catarrhal symptoms. This probably greatly reduces the infectiousness of such cases. The rash has been faint, with individual macules almost discrete, and the abbreviation in the course is well illustrated by the temperature charts.

Economy in Choosing and Buying Drugs.

By H. OWEN CHAPMAN,

Hodge Memorial Hospital, Hankow.

(*China Med. Journ.*, Feb. 1927, p. 141.)

EVERY time a doctor through ignorance or laziness, unnecessarily spends money on drugs, he is misusing his trust funds, and wrongfully depriving those who should benefit by them.

A most seductive temptation is presented by the never ceasing stream of leaflets, letters, reports, booklets, blotters, and neat little sample packets that flutter down out of the blue on to our desks every day. There is only one place for such samples and their accompanying literature—the waste paper basket; and the time to

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put them there is as soon as we find them on our office tables.

In any case no order should ever be given for such drugs, or even for new remedies quoted in articles in our regular scientific journals, without first carefully enquiring the price.

No matter how small our hospital may be, a hospital pharmacopœia is essential if we are to guard ourselves from erratic and careless buying.

We could hardly do better than take as a model the formulary of the Peking Union Medical College Hospital.

The aim which has guided the preparation of this pharmacopœia has been, to quote its own words, "..... to eliminate in so far as is possible all irrational mixtures, and useless drugs, encouraging reliance on drugs or mixtures of known value," and again "to limit the number of drugs and special preparations to be carried in stock to the minimum, and to eliminate needlessly expensive drugs when others are known to possess the same therapeutic value." And the result of applying these principles has been the production of a pharmacopœia which, including gland extracts, vaccines, serums, and the more elaborate synthetic drugs of proved value, numbers only 184 drugs.

Certain inefficient drugs in use should be excluded.—There are the decoctions which are used chiefly for the sake of their old associations: these must go, and also all flavouring syrups except one which we should pick out from the collection available and use for all purposes. Of the aromatic oils we shall not need to retain more than three or four for flavouring. All infusions without exception may be dispensed with, for the corresponding tinctures are more suitable for our use and all stomachics and bitters except gentian, and, for iron mixtures, calumba. If we keep more than these they will only so much the more rapidly grow stale in stock and lose their efficiency, as the shelves of our dispensaries give such overwhelming and sorry evidence.

The principle should be laid down in our Mission Hospitals that, even in the case of dry salts which keep indefinitely, duplication of drugs which have an identical or similar action is inefficient and wasteful. It entails more capital outlay, dearer buying because in smaller quantities, more shelf-room and stock bottles, more danger of inadvertently 'double banking' in buying, and more waste of doctor's and dispenser's time; and besides this it is self-evident that the more expensive of several alternative drugs represent an absolute waste of money. It is however extraordinary the extent to which this principle is generally violated. In the dispensary of one hospital which is exercising exemplary economy in other directions we found ammon. benz., sod. benz., and ac. benz.; bism. carb., bism. subnit., and bism. salicyl.; pot. brom., ammon. brom., and sod. brom.; lith. cit., and lith. carb.; cambogia and ol. crotonis; antipyrin and antifebrin; pot. nit., pot. cit., pot. acet., and liq. ammon. acet.; nine different hypnotics including the bromides; and twelve different essential oils including olea pini, cajuputi, and origani.

Expensive drugs should never be stocked when cheaper ones would be as effective.—Spir. aeth. nit. decomposes so rapidly that for practical purposes it may be considered inert by the time it reaches a patient incorporated in a mixture. Liq. trinitrini, a stable preparation of similar pharmacological action which is unfailingly produced whenever the drug is exhibited, is available at a price which, dose for dose, is only a tiny fraction of that of nitrous æther. Although one or two carefully chosen cheap liniments would meet all our hospital needs, we list a larger number, some of which are expensive. All confections and lozenges should be forsworn: everything we need in that line can be supplied by one or two varieties of compressed tablets.

Two preparations of the same drug should not be stocked: thus the infusion of a drug will not be listed if the tincture is kept. With the exception of opium and possibly of nux vomica, the crude drug or galenical is not needed if the active principle is stocked: thus aloin should exclude Ext. Aloes Barb.

Malt preparations of cod liver oil of 30 per cent. strength are very generally used by our hospitals at a cost of about $0.75 per lb.

The preparation of tinctures in the past has presented a very difficult problem, and such relics in our dispensaries as rad. gent., rad. calumba, rad. jalapæ, rad. scillæ, quassiæ lig., pulv. cinnamomi, pulv. kino, and pulv. cubebæ tell their own story of the heroic efforts of past generations to wrestle with it.

The only method worth considering to-day, and one generally adopted, is that of purchasing concentrated tinctures or fluid extracts abroad, and making up the tinctures as required by the addition of the good and cheap local rectified spirits. Such fluid extracts, with a few exceptions, keep well, and they are relatively much cheaper than tinctures.

Those few drugs, such as the fluid extract of digitalis and ergot, which deteriorate rapidly, will of course be bought at frequent intervals in ¼-lb. bottles.

The only preparations that remain to be dealt with are ointments, pills, and tablets. Most ointments can be made in the dispensary, but the work is often inefficiently done. Except for two or three main lines there is little saving to be effected for the trouble; it may probably be deemed better to purchase them ready-made unless the volume of work is sufficient to justify investment in an ointment machine. It is not worth while to make any stock lines of pills in the dispensary. Very few kinds will be needed.

Radium Therapy in Carcinoma of the Cervix

By WILLIAM P. HEALY, M.D. (New York, U. S. A.).

(*New York State Journal of Medicine*, Feb., 1, 1927, p. 116.)

So strong has become the conviction of the futility of hysterectomy in this disease that in some of the outstanding gynæcologic clinics in Chicago, Philadelphia, and New York, it has been entirely discarded and treatment by radium and *x*-rays substituted. This is one of the strongest arguments against operation, for these men are specialists in pelvic surgery, and if they are willing to accept radium therapy, there is very little excuse for general surgeons continuing to treat carcinoma of the cervix by hysterectomy. It would be just as reasonable for them to treat mammary cancer by simple mastectomy, ignoring the axillary lymphatics; or carcinoma of the lip or tongue by excision of the primary lesions and neglect of the cervical lymphatics.

Some cases of carcinoma of the cervix have remained well after hysterectomy alone and some after cautery amputation of the cervix, but these cases are so limited in number that they only point the exception to the rule.

Considering only the very early cases, we may dispose of the primary lesion by electrocoagulation, cautery amputation of the cervix, hysterectomy or radium. With any one of these methods the primary lesion may be so thoroughly removed that there will be no local recurrence. Nevertheless, the patient will almost inevitably develop cancer in the parametrium unless further treatment is promptly instituted.

When we turn to a consideration of the border-line and advanced groups, we have an entirely different problem. Here we can say without fear of contradiction that irradiation therapy represents the best and safest treatment from the standpoint of relief of symptoms, prolongation of life and, in some cases, possibly entire elimination of all active disease.

1. Hysterectomy as a means of removing the primary lesion may still be done in very favourable cases.

2. When hysterectomy is done, it should be promptly followed by thorough post-operative cross-fire irradiation of the pelvic field.

3. If facilities for proper radiation therapy are available, hysterectomy should not be resorted to in the treatment of carcinoma of the cervix.

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4. A combination of radium and *x*-ray therapy seems to be the most efficient form of treatment at present.
5. Unfortunately, the vast majority of the patients who develop carcinoma of the cervix will die of the disease because of the difficulties incident to early diagnosis.
6. All benign cervical lesions require constant watching until cured.

A Study of Thirty-four Cases of Rapidly Developing Syphilitic Paraplegia.

By M. CHUNG,

(Abstracted from *Archives of Dermatology and Syphilology*, August, 1926.)

(*Journal of Trop. Med. and Hyg.*, Jan., 1st, p. 12, 1927.)

RAPIDLY developing paraplegia of syphilitic origin is a common neurologic symptom in China. A study of thirty-four cases distinguishes two groups: (1) an acute type which develops either overnight or within forty-eight hours, accompanied by a flaccid paralysis with total loss of sensory function below the lesion, with sphincter disturbances and vasomotor changes; (2) a subacute type which develops more insidiously, associated more often with a spastic paralysis with increased reflexes, disturbances in sensation, sphincter troubles and trophic changes. The pathologic condition underlying these lesions in the acute cases is always thrombosis of one or more important spinal vessels with secondary changes in the cord; and in the subacute cases is also one of thrombosis, but with a more widespread meningomyelitis. Recovery is not rare. In general, the disease is not rapidly fatal; but the prognosis as to function in protracted cases is grave. Re-establishment of the circulation is largely responsible for the cases of recovery. The use of arsphenamin is necessary to cure the underlying syphilis and to prevent, if possible, further damage to the nervous system.

A Case of Idiosyncrasy to Carbon Tetrachloride.

By J. A. CARMAN, M.B., B.S.

(*Kenya Med. Journ.*, December, 1926, p. 260.)

IN an investigation recently undertaken at Kabete Reformatory the efficacy of the anthelminthic action of carbon tetrachloride in uncinariasis has been tested.

In all seventy boys were treated in batches of ten with combined doses of carbon tetrachloride and magnesium sulphate. The first batch received 2 c.c. of the first drug followed at once by one ounce of the purgative. The next five batches were all given 3 c.c. of the vermifuge and the salts at varying intervals.

Since no boys showed any toxic symptoms it was thought safe to increase the dose of carbon tetrachloride to 4 c.c., the magnesium sulphate being given immediately after.

This was done with the last batch of ten boys and nine of them showed no signs or symptoms whatever. The tenth boy who was, curiously enough, the largest and most robust of the group, gave cause for grave anxiety.

About half an hour after taking the drug he complained of a sensation of giddiness and within two minutes he lay down and became incapable of speech. His respiration was shallow, his pulse thready and irregular and in a matter of seconds he was quite unconscious.

Two drachms of whisky were at once administered with some improvement of his pulse and as soon as a syringe could be sterilised a maximal injection of strychnine was given.

The effect of this was negligible and the boy stopped breathing, whereupon artificial respiration was started with striking results. When the chest had been compressed only twice the patient spontaneously inhaled a deep breath and his eyelids flickered. The odour of carbon tetrachloride was most marked in the expired air. The treatment was continued for about ten minutes when the patient signified his desire to sit up though he was still unable to speak.

It was not for a further two hours that he spoke and in the interval his behaviour was that of a patient recovering from an anæsthetic.

The next day the boy complained of slight pain over the liver, but presented no clinical signs other than slight unsteadiness on his feet.

In view of the serious effect of the drug on this patient it is possible that he would have been upset to an unwarrantable degree by even half the dose. The fact that none of the other boys in his batch had so much as a feeling of giddiness seems to indicate that the one who was so seriously poisoned was peculiarly susceptible to the drug. The most likely explanation is that there was some abnormality of hepatic function.

It should be mentioned that the purgative had acted before the onset of symptoms.

The conclusions drawn from this case are as follows:—

1. That 3 c.c. is the largest dose of carbon tetrachloride which it is safe to give.
2. That as soon as symptoms of poisoning begin, deep breathing should be commenced and if unconsciousness supervenes artificial respiration should be started.
3. Ether, by reason of its action on the respiratory centre, would be the best stimulant to administer hypodermically.

Reviews.

THE LIFE AND WORK OF SIR PATRICK MANSON.—By P. H. Manson-Bahr, D.S.O., M.D., F.R.C.P., and Lieut.-Col. A. Alcock, C.I.E., LL.D., F.R.S., I.M.S. (Retd.). London: Cassell and Co., Ltd., 1927. Pp. 273, with 12 half-tone plates. Price, 16s. net.

THERE are four books which should be on the bookshelf of every practitioner of medicine in the tropics: René Vallery Radot's *Life of Pasteur*—(the English translation by Mrs. Devonshire); Sir Rickman Godlee's life of *Lord Lister;* Sir Ronald Ross' *Memoirs;* and Sir William Osler's *Æquanimitas and Other Essays.* The first will tell him how modern and present day medicine was born; the second how modern surgery was created; the third will tell him of the early and difficult pioneer days of tropical medicine; whilst the fourth will give him sage, witty, and invaluable counsel in the difficult career of medical practice under all its differing aspects. To these must now be added a fifth; Manson-Bahr's and Alcock's *Life and Work of Sir Patrick Manson;* for to be ignorant of that wonderful career is to be ignorant of the origins of present day tropical medicine. In many ways one considers it a calamity that Manson did not write an autobiography; he was far too modest to do so, though such a volume would have made a special personal appeal to a thousand and one students of tropical medicine; yet the authors have seen to it that—next to an autobiography—they have presented a faithful and exceedingly interesting presentation of the facts.

"Some are born to greatness; others have greatness thrust upon them"; yet Sir Patrick Manson belonged to neither of these groups, rather he attained to greatness by virtue of his dogged and persistent work—often under the most adverse conditions, and—if one may be permitted to use the phrase in no derogatory sense—by opportunism, for he ever seized upon opportunity whenever and wherever it offered for his life's ambition—the furtherment of the science of tropical medicine within the confines of the British Empire. And Dr. Manson-Bahr's and Colonel Alcocok's study of the great pioneer is of absorbing and vital interest.

Manson was not an Irishman, as is so often supposed to have been the case. It is true that towards the close

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of his life he took a fishing lodge in County Galway, and that he was as much *persona grata* amongst the tenants of that rude country-side as any native, whilst immediately after his death, his house and many of the most valuable records of his life and career were burnt down by the Sinn Fein, an occurrence which was not uncommon in Ireland in 1922. He was of Scottish descent, the descendent—as he picturesquely put it "of Norwegian pirates," son of the laird of Fingask, and born of Aberdeenshire stock in October, 1844. Educated at school in Aberdeen, the chief incident of his schooldays appears to have been his absorbed interest in the tapeworm of a marauding cat which he had shot—an omen perhaps of his future career. He entered the University of Aberdeen in 1860, and qualified in 1863. In 1866 he was granted the degree of M.D. (Aberdeen), his thesis being an essay on "A peculiar affection of the Internal Carotid Artery in connection with Diseases of the Brain," the dissections upon which this paper was based being still preserved to this day in the University Museum of Anatomy. Soon after qualifying he obtained employment in the Chinese Imperial Maritime Customs through the agency of Sir Robert Hart, who used to recruit most of his medical officers from the Scottish Schools, and found himself deposited with his belongings on a dark night in June 1866 on the beach at Takao, an outpost in Formosa with a small society of about sixteen Europeans where he was destined to spend the next five years of his career. The big trading port of Amoy however was the chief scene of his labours during the next thirteen years.

In the seventies of the last century there was a happy spirit of service and brotherhood among the Europeans in the Chinese Treaty Ports, and Manson soon found himself in a busy and congenial atmosphere. One of his first purchases was a microscope; indeed he appears to have been one of the first medical practitioners in the tropics to have indulged in such a necessity. Dr. H. B. Guppy, F.R.S., writes of him in 1877 as happy in his microscopic investigation of the blood of Chinese patients, and "with a health and vigour more suggestive of a British hunting squire than of a student on the eve of a discovery that has wrought so much for the benefit of mankind." To the day of his death, Manson was a warm admirer of the Chinese; indeed at the London School of Tropical Medicine he would frequently address Chinese patients in curious noises which his students could not understand, but to which the patients responded—or sometimes did not respond, since so varied are the tongues of China.

In Amoy Manson's reputation was first established by his boldness in surgical work. Lithotomy and above all operations for elephantiasis were his special rôle. The Chinese population watched, sceptical, puzzled, but attentive. But with success came the overcoming of distrust and suspicion, the beginnings indeed of popularity. Associated at first especially with the London Missionary Society's hospital in Amoy—where he carried out most of his operative work,—he realised that the better class Chinese patients and Mandarins would not resort to a public hospital, and he accordingly opened a private hospital for such patients. Meantime, as his practice grew, he was up against one of the greatest stumbling blocks in the general practice of medicine in the tropics—the refusal of relatives to permit *post mortem* examinations on patients who had died in hospital. And here we read of strange procedures—of partial autopsies carried out at dead of night in Chinese cemeteries, of almost any and every expedient resorted to in order to obtain that most essential *post-mortem* information which would confirm or repudiate the diagnosis made during life. It is not too much to say that during such enquiries Manson not infrequently went in danger of his life.

A further point during his practice in Amoy was the frequency of liver abscess among European sailors who visited the port; this led to the introduction of Manson's well known trocar for the drainage of liver abscess. Manson wrote of himself at this time as "an indifferent surgeon but a good carpenter." Still further difficulties awaited him when a "hot gospeller" was appointed to the Amoy Mission, who considered that Manson's rôle in saving Chinese lives should be subordinated to the saving of Chinese souls; also his apparent difficulties in securing publication of his reports and case histories. From 1871 to 1883 the majority of his reports appear to have been published in the *Customs Gazette, Medical Reports, Shanghai*, and he appears to have been diffident at first in submitting medical articles for publication to the best known British medical journals.

In 1875 Manson returned Home on leave and was married. He returned to Amoy and devoted himself to the special study of filariasis among the Chinese, with an associated study of filariasis of dogs and other animals. He soon discovered that elephantiasis is not especially associated with the presence of microfilariæ in the blood, and that the microfilariæ had a nocturnal periodicity in the blood stream. "After the lapse of forty years," write the authors, "it may be fairly said that if they (Manson's observations) do not contain the whole truth about filariasis, they contain nothing but the truth and nothing but what is very much to the point and very generally instructive." His discoveries with regard to filariasis were communicated to Professor Cobbold, the well known helminthologist in London, and were presented by him to learned societies in London.

Puzzled by the nocturnal periodicity of the microfilariæ in the blood, and by the similar but less marked periodicity of *Filaria immitis* of the dog, Manson began speculations in 1877 as to the reason for this periodicity. In September of that year he discovered the transmission of *Filaria bancrofti* by mosquitoes of the genus *Culex*, published his findings in the *China Customs Medical Reports*, and communicated them to Cobbold, who informed the Linnean Society in London of the discovery in 1878. There have been attempts to belittle the rôle of Manson in this discovery, but the facts will out; his drawings of the ecdysis of the larva and of its stages of development in the mosquito, made at the time, admit of no mistake. But at the moment he was an unknown investigator, working quietly in a far-off field, with no influence to back him, and no channel of publication other than the *Customs Gazette*. To the medical research worker of to-day, who finds his "publicity department" rather more of a hindrance than a help, Manson's position in 1877 seems an almost incredible one. Filariasis, though a most inconvenient and important tropical disease, did not appreciably affect the movement of trade and commerce in Chinese waters, and there was no one available to blow Manson's trumpet for him. In the meantime he discovered the lung fluke, *Paragonimus westermanii*, in the sputum of a Chinese mandarin who insisted on spitting on the floor of his consulting room. Also he discovered his first adult *Filaria bancrofti*, by dead of night and by lantern light in a surreptitious *post-mortem* examination held in a Chinese cemetery.

Manson was now nearly 40 years of age, and family cares were beginning to tell on him. He had obtained a clear and comprehensive insight into the chief problems of medical practice in the tropics (as afforded by experience in China). Accordingly he took leave to England. Here, he hoped, he would find information and teaching with regard to the special diseases of the tropics. One-fifth of the British medical graduates on the roster of the General Medical Council were practising in the tropics: surely he had but to apply to some big London hospital to find that special course of instruction in diseases of the tropics for which he so ardently sought.

His disappointment was intense. There was nothing of the kind. He ventured upon letters to the daily papers and medical journals, and was told in reply that what was good enough for England was good enough for the British Empire. The principles were all that mattered; if a medical student once mastered these, he could go and practise anywhere; the study of tropical diseases was but a part of the study of medicine

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generally. If he wished for special information with regard to filariasis—a subject in which Manson was now deeply interested—he might go to the reading-room of the British Museum. And—incredible as it may seem to the present generation of post-graduate students—he was driven there, to find that Bancroft had already discovered the adult *Filaria bancrofti*, and that nowhere else was the literature upon the disease available. He also discovered that Timothy Lewis in Calcutta had discovered the microfilaria of the same parasite in blood films taken from patients at the Medical College Hospital, Calcutta.

Manson now returned, not to Amoy, but to Hongkong. The necessity for a special School of Tropical Medicine was by now deeply engraved upon his mind; and in Hongkong he started such a School. In 1886 Manson received the honorary degree of LL.D. of Aberdeen University, and in 1887 the Hongkong College of Medicine—later to be incorporated into the Hongkong University—was opened; a project which Manson took a large share in bringing to fruition. In 1886 he was joined in partnership in Hongkong by Dr. (afterwards Sir James) Cantlie.

By this time Manson was suffering rather severely from the gout which was his life-long enemy, and he decided to retire. But in his farewell address to his students he summarised his experience of the East. "Unless you get people willing to receive them" he remarked, "there is very little use offering sanitary privileges or trying to carry out sanitary measures. I recollect that an elaborate system of drainage and of model municipal sanitation was supplied to the Chinese. Water-taps, traps, drains, ventilators, and all the rest of it were placed at their disposal. The Chinese turned on the water-taps, but they were too lazy to shut them: and naturally the supply calculated to last a year was exhausted before half the year was over. The traps had gratings which had been placed over them to prevent their being choked; gratings and traps were ruthlessly removed to facilitate the escape of domestic rubbish." This, however, is the dark side of the picture. In his inaugural address at the opening of the Hongkong College of Medicine Manson dwelt upon the immense vistas of research work and investigation opened up by the foundation of this College. China was an uncertain factor in the world's future; but she was thrifty, industrious, persevering. The future of medical science in the tropics might well lie within her borders. The duty of European medical men in China was to assist with both hands. He who did so "deserved well of his country."

At the age of forty-six Manson returned from "foreign parts" and commenced private practice at No. 21, Queen Anne Street, Cavendish Square. His first endeavour was to install a private laboratory in his consulting rooms; indeed to the day of his death this small laboratory was a special feature of his consultant and private work. A comprehensive medical library and a small museum were also the subjects of considerable care. He entered into arrangements with different Missionary Societies for the supply of blood films from different quarters of the globe, convinced that such a study would reveal the existence of hitherto undreamt of blood-inhabiting parasites. In May 1892 he was appointed Physician to the Seamen's Hospital Society of Greenwich—an appointment from which the earliest beginnings of the London School of Tropical Medicine may be said to date. Lectures on filariasis and on guinea-worm infection occupied his time, whilst the British Medical Association proposed that he should be granted the (wholly inadequate) sum of £150 to proceed to the West Indies to study the newly discovered malaria parasite. In 1896 he secured the release of Sun-yat-Sen—one of his former medical pupils at Hongkong—by appealing to the Foreign Office, from capture by the Chinese officials in London.

In July 1897 Manson was appointed Medical Adviser to the Colonial Office. It was the beginning of the most notable forward movement in the sphere of tropical medicine in the British Empire; for probably none other than Manson could have accomplished what he did with this influence to back him during subsequent years. In 1898 the first edition of his famous *Manual of Tropical Diseases* appeared, whilst in 1900 he was elected a Fellow of the Royal Society and President of its Epidemiological Section. In 1903 he was knighted, and in 1904 received the honorary D.Sc. degree of Oxford University.

Manson's connection with the Colonial Office immediately brought him into contact with the most brilliant Colonial Secretary which the British Empire has ever possessed, the late Joseph Chamberlain. "Joe" Chamberlain has frequently been assailed by his political opponents for his unorthodox political opinions on such subjects as Protection and Irish Home Rule, but even they must admit his whole-hearted devotion to his duties as Colonial Secretary. Manson, immediately on his appointment as Medical Adviser to the Colonial Office, brought forward his scheme for the creation of a School of Tropical Medicine in London, and he found in Mr. Chamberlain an enthusiastic and influential supporter of the scheme.

In the meantime Laveran, in 1880, had discovered the malaria parasite, (*Plasmodium malariæ*), and Manson had appreciated the full importance of this discovery. When the "crescents" of *Plasmodium falciparum* were discovered, the progress of "ex-flagellation"—(or formation of microgametes by the male gametocyte)—was shortly afterwards discovered, and the time was ripe for the proof of the mosquito-malaria transmission theory. A. F. A. King in America in 1883 indeed had written a most remarkable paper in which he gave nineteen main reasons to prove that malaria was transmitted from man to man by mosquitoes. Manson—with his recent work on the transmission of filiariasis by mosquitoes prominently before him—was not long before he seized upon the suggestion.

Everything at this stage turned upon the correct interpretation to be put upon the process of "ex-flagellation" of the "crescent" form of the malignant tertian parasites. Manson formulated the theory that the mosquito—he did not specify which genus, indeed the different genera of mosquitoes were not differentiated at that period—imbibed the "crescent bodies" with the patient's blood; that these underwent further development in the mosquito's body; that the female mosquito when she oviposited died; that her dead body and the contained parasites contaminated the water supply; and that man contracted malaria by drinking such infected water. It is in some measure true to say that Manson enunciated the "mosquito-malaria" theory, (although one considers that the authors lay too much stress upon his share in the discovery). He was but one among a number of scientific observers who were at that time feeling their way towards the truth.

What is far more true—in Manson's own words—is that he "discovered Ross," and therein lies his real measure of credit in the great discovery. For at that time Ross was merely an obscure Surgeon Major in the Indian Medical Service, and—until Manson demonstrated the malarial parasites to him—quite unconvinced that the parasites were real. From first to last Ross owed the only influential backing that he could bring to bear to Manson. It was Ross who made the discovery—and incidentally found that the cycle of transmission was far other than Manson had supposed it to be; but it was Manson who made Ross' work possible; for, from first to last, he strove in season and out of season to bring Ross' work to fruition; to enable a then obscure and solitary worker in this immense field to be placed on special duty to prosecute his researches. From first to last Sir Patrick Manson acted as sponsor to Sir Ronald Ross' work; in fact it was he who first publicly announced the "great discovery" at the annual meeting of the British Medical Association in Edinburgh in 1898. Without Manson's influential and official backing it is improbable that Ross would ever have been granted the leisure and opportunity to make the great discovery. There is no need to raise controversy as to the relative parts played by these two

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great and distinguished research workers in this field; to Manson was due the inspiration and the tremendous backing which he was able to bring to bear as official Medical Adviser to the Colonial Office; to Ross—whose work with reference to human malaria was later supplemented by that of the Italian discoverers—belongs the credit of the great discovery itself. The recorded correspondence of the years concerned between Ross and Manson reveals such an intimate spirit of companionship and fellowship that it seems a thousand pities that subsequent commentators should strive to give either an undue share of the merit at the expense of the other. Yet in chapters IX and X of the present volume the balance is perhaps more evenly held than is usual; whilst, with regard to the share of the work done by the Italian workers, Sir Patrick Manson is quoted in a letter to Ross as follows; "Practically you had already done it, and you can justly claim to have been the first to find the malaria parasite in the mosquito, as well as to point out the *modus operandi* of that insect in diffusing malaria."

In 1894 Manson received seven adult *Filaria bancrofti* from Surgeon Major Maitland of Madras, who had dissected them out of a mass of distended lymphatic vessels; he was thus enabled to establish the anatomy of the adult worms on a sure footing and especially to give an accurate description of the tail end of the male adult; in fact his drawings in connection with this piece of work to-day constitute the basis of the text-book figures of *Filaria bancrofti*. In 1896 he had an opportunity to perform an immediate *post-mortem* on a patient suffering from filariasis who had committed suicide in London, and was able to isolate the adult worms in their living state, as also to determine that during their apparent absence from the peripheral blood the microfilariæ tend especially to congregate in the blood vessels of the lungs. In 1903 and subsequent years we find him interested in the life history of the guinea-worm, whilst in 1902 he discovered the ovum of *Schistosoma mansoni*—a species whose independent status was proved several years later by Leiper. From 1896 onwards we find him interested in the problems of African sleeping sickness, and in 1900—a year before Ford first discovered *Trypanosoma gambiense* in the blood of human patients—Manson had seen the same parasite flit across the field of vision under the microscope in a specimen of blood from a European patient with sleeping sickness, but had not been able to obtain further material for study.

By 1897 Manson's position as the leading consultant in tropical diseases in the United Kingdom was well established; and he was in close personal touch with Mr. (now Sir) James Michelli, Secretary to the Seamen's Hospital at the Albert Docks. It will be recalled how in 1882 Manson had sought for special information on the subject of tropical diseases at the London hospitals, and had found that the subject was entirely neglected. From 1897 onwards his energies were concentrated on the scheme for instituting a School of Tropical Medicine in London, the heart of the British Empire. On this theme he continued to preach day in and day out; for instance, it formed his thesis at his presidential address at the meeting of the Tropical Diseases Section of the British Medical Association in Edinburgh in 1898. A further address at St. George's Hospital was brought to the notice of Mr. J. Chamberlain, Secretary of State for the Colonies. Chamberlain at once threw himself into the movement; he addressed the General Medical Council of the United Kingdom and the different British Universities. Dinners were held and funds were raised. In the beginning the London School of Tropical Medicine was a very humble venture; it was held in a small house—almost a cottage—near the Albert Docks. Later, thanks to a donation of £100,000 chiefly collected by the exertions of Lord Milner, the move was made to Endsleigh Gardens. To-day, the new and sumptuous London School of Hygiene and Tropical Medicine is under construction in Gower Street, endowed with a grant of one million dollars by the Rockefeller Foundation, and a promise of the cost of maintenance by the British Government, a School worthy perhaps of the vast Empire whose medical and hygienic interests it represents.

Manson, of course, from the start was the honoured chief of the staff of the School. "A special diploma from a university would, I believe," he writes "tend to foster and advance the study of tropical medicine. But the qualifying standard should be a high one. It should imply not only a good practitioner but a capable investigator." It is a message which Schools of Tropical Medicine all over the world might take to heart. In 1920 it was stated that since the London School's foundation a quarter of a million pounds had been raised for its maintenance, and no fewer than 2,544 students had passed through its post-graduate course of instruction. In the Great War in every field the past students of the London School of Tropical Medicine acquitted themselves honourably and well.

During the greater part of his life Manson had been a martyr to gout, and in 1912 he resigned his post at the Colonial Office. After a trip to Ceylon he returned to England and passed the summer in Ireland. In that year he was the central figure of the Tropical Section of the International Congress of Medicine in London, and was hailed by Professor Blanchard, the eminent parasitologist, as the "father of tropical medicine:" a title by which his memory is still universally remembered. Fourteen days before his death we find him again at the London School of Tropical Medicine—driven out of his home in Ireland by the misdirected activities of the Sinn Fein—teaching and demonstrating on the subject of filariasis, which he had made so particularly his own. He died on the 9th of April 1922 in his seventy-eighth year.

This book by Dr. Manson-Bahr and Colonel Alcock will be a treasured volume to all who came into personal touch with Sir Patrick Manson. It is perhaps too soon in the course of time to award to Manson the niche in the history of tropical medicine—perhaps the altar-piece—which time will award to him. But it is, alas! too late to look back upon his singular charm, his willing readiness to be interested in new suggestions or discoveries, his enthusiasm, and above all his power of arousing enthusiasm in others. In chapter XIV the authors comment on "Manson's philosophy of life," and this chapter is the most attractive in the book. For the man was greater by far than the scientist; though perhaps the authors have stressed his aspect as a scientist rather more than his personality. Perhaps we cannot do better than quote Dr. Andrew Balfour*; "What a record of work Manson left behind him, and what a host of admirers, of disciples, of friends!..... It was an education to sit at his feet, a still greater education to hold converse with him..... He was a man of weight and substance, a man to inspire confidence, a leader it were well to follow..... And though we are poorer because he has gone from amongst us, yet we are rich in the knowledge which he and those who followed him wrested from Nature, and we may say, as did one who wrote feelingly after his death: He has left behind a great inspiration to all who had the good fortune to be closely associated with him. How much we owe to this great man it is difficult to estimate. His monument is in our hearts." He was the pioneer *par excellence;* blazing the new trail, seeing to the footsteps of those who followed, content that to his fortune it fell to help others to follow where he had led.

R. K.

YOUNG'S PRACTICE OF UROLOGY, BASED ON A STUDY OF 12,500 CASES.—By Hugh H. Young and David M. Davis. Two volumes. London and Philadelphia: W. B. Saunders Company, Ltd. Pp. 1433 with 1,010 illustrations, 20 in colours. Price, £5-5-0 per set.

THIS work is entirely different in character from the usual systematic text-book. Instead of being based on

* *Transactions, Royal Society of Tropical Medicine and Hygiene* (1925), Vol. XIX, p. 89.

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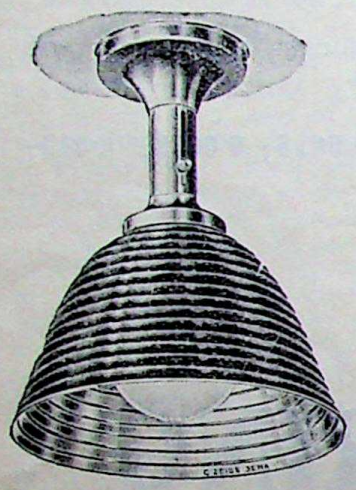

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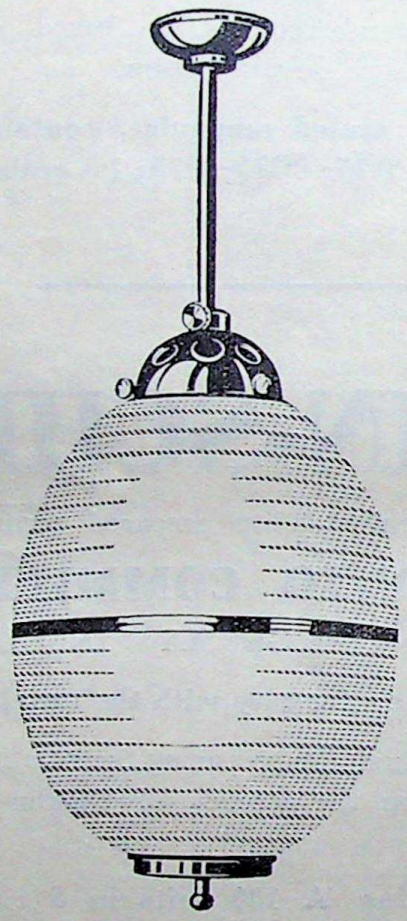

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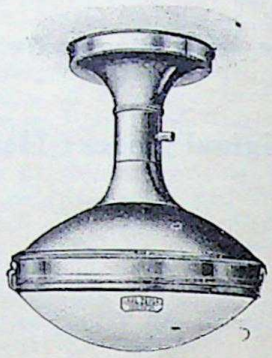

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an anatomical arrangement, the subject is treated throughout from the pathological standpoint. After a preliminary chapter on the physiology and pathology of micturition, in which some interesting observations by the authors on the anatomy of the trigonal muscle are incorporated, we proceed to the study of obstructive uropathy. First the pathological changes produced in each part of the urinary tract by obstruction are dealt with, followed by the symptomatology and the diagnosis. In the estimation of kidney function the authors indicate their preference for the estimation of blood urea combined with the phenolsulphonaphthalein test, for which they have introduced a new colorimeter enabling the test to be carried out more rapidly than with the ordinary Duboscq type. Maclean's test is considered to give no more information than these two tests combined, and is not employed in their clinic. The practice in English clinics differs in this respect; most of our urologists are of opinion that the urea concentration test will never let one down in the estimation of total renal function, provided that certain conditions in carrying out the test are fulfilled, and it is far easier to carry out in practice than any dye test. For the estimation of each kidney function separately the phthalein test is of course superior; the need for this does not arise so frequently, but seeing that it must be provided for, the authors' methods are perhaps the best for use in clinics, if not in private practice. For the making of pyelograms a combined cystoscopic and *x*-ray table has been designed furnished with a Bucky diaphragm, enabling the plate to be taken without moving the patient and capable of rotation through 90 degrees, so that plates can be taken in the upright as well as in the horizontal position, the only way of determining exactly the degree of mobility of the kidney. The principles of treatment are considered as a whole and as affecting each organ, and we are introduced to Young's ingenious decompression apparatus, which allows the bladder to be emptied at any desired rate and at the same time keeps an antiseptic solution of adequate strength in continuous contact with the interior of the bladder. The use of this apparatus enabled a catheter to be retained for an average of 13 days each in 10 patients without infection appearing, a very remarkable achievement.

There follows a long chapter on urogenital infections, dealt with in the same manner, first the bacteriology in general, then the pathological changes in each organ, then the symptomatology and diagnosis, and lastly the treatment. The whole work is constructed on the same plan, which at first sight would seem very inconvenient for reference, since the diseases of a given organ, say the prostate or the epididymis, are to be found scattered throughout the volumes. The method however lends itself admirably to the authors' object, which is to present a record of personal experiences and research, based on the case sheets of 12,500 patients treated at the Brady Urological Institute, Baltimore. The labour involved in studying these records, writing follow-up letters, and classifying the results must have been colossal, but the results amply justify it. We have here a personal record based on immense experience, not a mere compilation of the literature, and the methods described are essentially Young's methods and are those which he considers the best.

It is impossible within the limits of a review to touch on all the points of interest, we must be content with noting a few of the more striking. Bacilli of the *coli* group accounted for 53.9 per cent. of 364 cases of urogenital infection investigated by cultural methods. In chronic prostatitis the gonococcus was found in only 1 per cent., *Staphylococcus albus* or *B. coli* being the usual findings. Sterile inflammations do *not* occur, even though no organism can be seen in the films. The use of mercurochrome intravenously for *B. coli* infections is dealt with at length and some brilliant results are quoted, a veritable "therapia sterilans magna." The dosage generally used of this substance is inadequate—5 mgm. per kilo is necessary if results like Young's are to be obtained. Diathermy is apparently not employed as yet in the Brady Institute in the treatment of acute prostatitis and epididymitis, a surprising omission.

The authors' views on the pathology of genito-urinary tuberculosis are very interesting. In a series of 222 cases of tuberculous epididymitis they found the vesicles involved in 83 per cent. and they regard this as the commonest primary site for infection of the seminal tract. The kidney may be primarily or secondarily infected and usually the exact route remains in doubt, but the infection is localised to one side for a considerable period, during which nephrectomy will effect a cure; 30 cases out of 65 in which there was no involvement of the seminal tract were cured by primary nephrectomy. Involvement of the seminal tract is dealt with by a radical operation in which epididymis, vas, lateral lobe of the prostate and seminal vesicle are removed in one piece. Of 34 cases treated by this operation 13 or 54 per cent. were apparently cured, a result which could not be obtained by any other method.

In the chapter on urinary calculus we find some interesting speculations on the part played by the urinary colloids in the formation of calculus. Primary nephrectomy is advised in cases where the kidney has been badly injured by the presence of large stones with infection superadded. Young is of course one of the pioneers of perineal prostatectomy and we find this operation described at great length; suprapubic prostatectomy is only done in special circumstances, where there is very large bladder stone, or where a suprapubic fistula is present, or a perineal operation has been already done and has failed. 1,049 perineal prostatectomies with a mortality of 3.4 per cent. is a wonderful result, but it must be remembered that the suprapubic cases with a mortality of 8.2 per cent. were generally worse risks. Still the perineal operation, the technique of which is elaborately described in Vol. II, is the more difficult operation, and there can be no question in our opinion that for the general surgeon the suprapubic operation is preferable.

Some very good results of the treatment of malignant papilloma of the bladder by radium and fulguration are recorded; 62 per cent. alive and well one year and upwards after the operation gives ground for hope in a condition in which open operation gives very poor results. Some ingenious instruments for the application of radium through the cystoscope are described, but the results from the use of radium alone are not nearly so good. In prostatic carcinoma radium applied by the rectum, bladder and urethra gave great relief to symptoms, but it is difficult to make out from the form in which the figures are presented how many cases could be classed as "cures." The second volume deals with malformations, methods of examination and operations. We note that the authors use an externally illuminated, non-inflating type of urethroscope, the exact opposite of the pattern which has now displaced all others in Europe, which goes to show that it matters little with what type of instrument one works, provided one becomes sufficiently expert with it. The descriptions of operations are lucid and beautifully illustrated and the reader will note many points in which the authors' technique differs from that in common use.

We have no hesitation in describing this as the greatest work on urology which has appeared in English of recent years. It is a record of painstaking research on which the authors are to be congratulated, as well as on their brilliant surgical results. It is not a book for the student, but the specialist in urology and the general surgeon who has to deal with urological cases will be well repaid for the time spent in the perusal of a most inspiring and original work.

W. L. H.

MODERN MEDICINE: ITS THEORY AND PRACTICE.—Edited by Sir William Osler, Bart., M.D., F.R.S. and Thomas McCrae, M.D. Volume, IV. Third Edition. London: Henry Kimpton, 1927. Sold in sets, 6 Vols. only and Index. Pp. lx plus 1011. Price, £12-12 net.

THIS volume is the work of twenty contributors, each of whom has attained to high eminence in his own

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speciality. The master hand of the late Sir William Osler has left an impress on the book which will not readily disappear. The articles on the diseases of the valves of the heart, diseases of the arteries and aneurism are partly by him. The rate and mechanism of the heart beat is discussed by Sir Thomas Lewis. Dr. A. G. Gibson of Oxford writes on hypertrophy, insufficiency and dilatation of the heart and revises the article on valve disease by Sir William Osler. The other authors are American or Canadian. It is impossible to review in detail a volume of over 1,000 pages, written by twenty experts. The first edition of this work was at once accepted by the profession as being the standard work of reference on medicine in the English language, and it is certain that this third edition will occupy as high a place as its predecessors. It is complete without being encyclopædic, and it is evident that much care has been taken to ensure that the various sections of the work fit into each other without overlapping or gaps.

THE PRACTICE OF MEDICINE.—By A. A. Stevens, A.M., M.D. Second Edition. London and Philadelphia: W. B. Saunders Company, Ltd., 1926. Pp. 1174. Cloth. Price, 35s. net.

THIS is one of the good standard text-books of medicine. It has not the vivid imaginative qualities of Osler's book, but it is essentially sound. Too many diseases are described, some rare conditions which are not likely to be encountered might well be omitted, and the extra space could well be used by the inclusion of illustrative temperature charts of the common fevers. The arrangement of the subjects is not altogether happy, for example the following diseases are discussed in the order given: dengue, rabies, foot and mouth disease, sprue, Oroya fever, verruga, gangosa, tsutsugamushi disease, phlebotomus fever, milk sickness, rat bite fever, miliary fever, goundou, ainhum. The capacity of the medical student or even of the medical man for acquiring a knowledge of the facts connected with diseases is limited, so that it is most important that the most should be made of aids such as the grouping together of related diseases. The articles on tropical diseases are sound on the whole, but not very abreast of modern knowledge. The account of kala-azar is an example of this defect and it is doubtful whether it is worth while to include descriptions of every disease which is known in the world in a student's text-book. These criticisms must not be taken as reflecting on the general quality of the book; on the whole it is extremely accurate and up-to-date, and will be found a reliable guide both by the student and the medical practitioner.

THE SHIP-SURGEON'S HANDBOOK.—By A. V. Elder, D.S.C., M.R.C.S. (Eng.), L.R.C.P. (Lond.). Third Edition. London: Bailliere, Tindall & Cox, 1927. Pp. xiv plus 523. Price, 10s. 6d. net.

HAVING reached a third edition, this little book is obviously a success. Every ship's surgeon will certainly secure a copy as the book deals specially with the numerous problems which he has to tackle. It is a pity that passengers should not also read Dr. Elder's comments on them and their strange behaviour. Sea-sickness naturally receives special attention and the chapter on this is exceptionally good. The ship's surgeon has reason to be grateful to Dr. Elder for giving him so valuable a course of instruction in his duties.

BAILLIERE'S SYNTHETIC ANATOMY.—By J. E. Cheesman. London: Bailliere, Tindall & Cox, 1926. Parts 1—3 Ready. Price, 2s. 6d. each.

THIS is a series of drawings on transparent sheets for facilitating the reconstruction of mental pictures of the human body. These drawings are intended to supplement the other methods of learning anatomy, not to replace them. The novelty of the device consists in the superposition of drawings made on transparent sheets so that it is possible to obtain clear ideas of the relations existing between structures which lie on different planes. The three parts which are issued deal with the upper extremity, nine other parts are in preparation. An index and full instructions are provided. It is likely that this ingenious device will make a strong appeal to the student, as it will certainly facilitate his task and will enable him to form clear ideas of the relationship which exists between the important structures of the body.

THE DIAGNOSIS AND TREATMENT OF TUBERCULOSIS OF THE HIP.—By G. R. Girdlestone, B.M. (Oxon.), F.R.C.S. London: Oxford University Press & Constable and Co., 1925. Pp. 94, with 60 illustrations. Price, 8s. 6d.

THE writer of this book claims that he has "tried to describe a plan which wastes no time, yet spares no pains, in diagnosis: which allows no hitch between diagnosis and treatment: and by which the treatment of the hip is so ordered that each patient is led, almost automatically, to that result which is, for him, the most useful, permanent and safe."

It may be said at once that the author has succeeded most admirably in the task he set out to perform, and anyone reading his book will obtain a very clear idea of the efficient methods by which tuberculosis of the hip is treated in English orthopædic hospitals.

To us in India, where orthopædic hospitals are almost unknown, it will help to serve as an incentive and a reminder that surgery has yet a long way to travel to reach its proper goal.

THE INFLAMMATORY AND TOXIC DISEASES OF BONE.—By R. L. Knaggs, M.C. (Cantab.), F.R.C.S. Bristol: John Wright and Sons, Ltd., 1926. Pp. 416. Price, 20s. net.

THE readers of this book will feel a regret that the author and publishers could not see their way to produce a larger volume. There are unmistakeable signs that a much fuller description of the subject, with more clinical details, is only denied to us from considerations of space and the student's purse. Is it too much to hope that when the success of this book is assured, an enlarged edition will appear?

The inflammatory and toxic diseases of bone are rather a nightmare to students, and by them especially will this book be welcomed. The various conditions known as bone diseases are clearly described and differentiated when possible. Most important of all, the pathology of the subject is fully dealt with.

Important and well-known cases are cited to illustrate the subject, and a valuable list of references concludes each chapter. A special word of praise is due to those responsible for the splendid illustrations—photographs, micro-photographs and sketches—which will be found on almost every page. More radiographic reproductions would be an advantage.

The reader will not be disappointed and the sum of his knowledge will assuredly be increased.

INTRODUCTION TO THE THEORY OF SPECTACLES.—By Otto Henker, D.Sc. (Jena), M.D., h.c. (Halla). Translated by R. Kanthack. Jena: Jena School of Optics, 1924. Pp. 336 with 339 illustrations and one photograph. Obtainable from Messrs. Adair Dutt & Co., Ltd., Calcutta. Price, Rs. 10.

THIS book, published by the Jena School of Optics and translated into English by R. Kanthack, deals largely with the products of the Jena firm of Messrs. Zeiss & Co. and their ideas in producing the various forms of spectacles and contrivances for improving defective vision associated with this firm. It commences with a useful explanation of the theory of lenses and the elementary laws of refraction, then discusses the normal human eye as an optical instrument, and goes on to discuss the correction by optical means of the various types of ametropia. In this the use of complicated mathematical formulæ is avoided as far as possible and liberal use made of graphs. A number of useful points are discussed, such as the actual size of retinal images in corrected and uncorrected cases of ametropia, and the effect on binocular vision. The selection and arrangement of bifocal lenses for presbyopes, and the possible width of field for clear definition in the case of high

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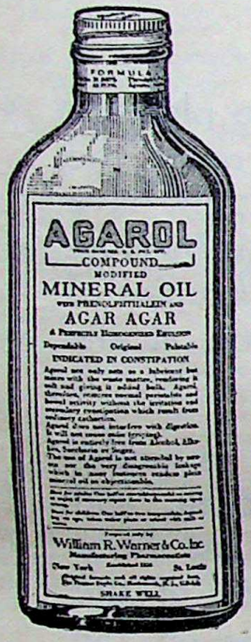

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degrees of ametropia are dealt with. A certain amount of this work is definitely devoted to pointing out the alleged superiority of the Zeiss' lenses. Altogether this book is of an unusual type, dealing with matters not usually thought of in connection with the prescription of spectacles, and it will be a useful addition to the library of any ophthalmic specialist, though he may not agree with all the statements in it.

LESSONS ON MASSAGE.—By Margaret D. Palmer. Sixth Edition. London: Bailliere, Tindall & Cox, 1927. Pp. viii plus 302 with 71 figures in the text and 2 coloured plates. Price, 10s. 6d. net.

THIS is a most useful book for anyone to read who contemplates learning the art of massage. The different sections of the book which deal with fractures, injuries to joints, and constitutional diseases which affect joints are well written. A special feature of the book also is the section devoted to the study of anatomy from the point of view of massage.

Annual Reports.

THE ROCKEFELLER FOUNDATION—ANNUAL REPORT FOR 1925. THE ROCKEFELLER FOUNDATION, 61, BROADWAY, NEW YORK.

As usual this report is of the greatest interest. The International Health Board spent about £640,000 during the year on disease control, public health education, etc., throughout the world.

The China Medical Board spent about £520,000, the Division of Medical Education about £620,000, and the Division of Medical Studies about £120,000, the total expenditure of the Foundation for the year being over £1,800,000. We can only give a few extracts from the report, but these will give some idea of the magnitude of the activities of the Foundation.

During 1925, the Peking Union Medical College carried on almost as usual. The number of students who entered in October was reduced not so much, it is believed, by difficulties of travel as by lack of family funds. The college is a unique item in the programme of the Foundation, the only case in which complete responsibility has been assumed for the building, staffing, and temporary maintenance of an institution.

From the outset the Foundation made clear that its purpose was not to create a permanently foreign institution in China, but to transform the College gradually into a Chinese medical centre with a Chinese staff and ultimately a Chinese board of trustees in complete control. It was recognized that this transition would have to be made slowly and carefully, as Chinese doctors and others proved themselves capable.

The setting up in co-operation with the College of a health centre under local auspices in Peking serves at least two important purposes. It affords a demonstration for the first time in China of a modern health organization with its clinic, records, visiting nurse service, and educational features, and it provides a means of giving medical undergraduates a much needed practical training in the meaning and methods of public health and preventive medicine.

On June 30, 1925, the members of the medical faculty and their assistants numbered eighty-seven, of whom forty-six, were Chinese. The teachers are graduates of thirty-one medical schools and represent ten different countries. There were also five teachers in the School of Nursing. There were also three visiting professors, two Americans and one Chinese. The student enrolment totalled 195, distributed as follows: Medical School, fifty-seven; School of Nursing, undergraduate students, twenty, graduate students, eleven; graduate and special students, both Chinese and foreign, 107. During the teaching year 1924–1925 eighty-four doctors and nurses, Chinese and foreign, were registered for either regular work or in short intensive courses on small grants from the China Medical Board.

During the year 1925 the Foundation, contributed to the maintenance of 842 fellowships, held by representatives from forty-four different countries. They are granted only to selected individuals of unusual promise for special professional training in preparation for officially guaranteed administrative, research, or teaching positions in government or university services. The prosecution of research is not ordinarily a direct activity of the Foundation.

In connection with the work of the Foundation, however, a good deal of original investigation of specific problems is being carried on either by staff members themselves or by men working in schools, institutes, or university departments.

In 1925 the Foundation was obliged to decline formal applications for aid to the number of 631, inasmuch as the types of assistance requested did not fall within the scope of its activities as determined by its present policies. The Foundation does not make gifts or loans to individuals, nor contribute to the building or maintenance of churches, hospitals (except as certain hospital features may be included in plans for medical education), and other local institutions, nor support campaigns to influence public opinion on social or political questions.

The income accruing from investments was $8,237,303: the balance carried over from 1924 was $7,611,793. Of these total funds, $9,113,730 was needed to meet the obligations which came due during the year and $6,170,047 was subject to call in fulfilment of outstanding pledges.

The International Health Board was created in 1913 "to extend to other countries and peoples the work of eradicating hookworm disease as opportunity offers, and so far as possible to follow up the treatment and cure of this disease with the establishment of agencies for the promotion of public sanitation and the spread of knowledge of scientific medicine."

In recent years, the Board's work has expanded to include co-operation with governments in the control of malaria and yellow fever, in addition to hookworm disease; aid in establishing public health laboratories; and assistance in developing essential divisions of state health services such as epidemiology, sanitary engineering, vital statistics, and public health nursing.

When collaborating with governments in the early stages of important new undertakings, the Board has found it advisable to send trained representatives to participate in the study of the problems, the selection of methods, and the demonstration of their application.

At the hookworm field research station maintained by the Board at Andalusia, Alabama, W. G. Smillie and his associates completed a study of the effects of varying degrees of intensity of infection with hookworms of the species *Necator americanus* on the physical and mental condition of school children. For the purposes of these studies the children were classified according to intensity of infection as follows:

Group.	*Number of Hookworms.*	*Intensity of Infection.*
1	0	No infection
2	1 to 25	Very light
3	26 to 100	Light
4	101 to 500	Moderate
5	501 to 1,000	Heavy
6	1,000 and over	Very heavy

The children with from one to twenty-five worms were found to be the equals of the non-infected group in weight, height, hæmoglobin index, and intelligence quotient. They had received no demonstrable injury from their hookworms. Those who harboured from twenty-six to 100 worms showed no measurable retardation. The moderate infected group (101 to 500 worms), but there was a slight reduction in the hæmoglobin index, and they also had a very slight mental retardation. The moderate infected group (101 to 500 worms) were definitely damaged. The children of this group who were over nine years of age were distinctly under weight and the group as a whole was below normal in

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standing height. The intelligence quotient was lowered. The hæmoglobin index was slightly reduced but definitely lower than that of normal children. The heavily infected and very heavily infected groups showed a definite retardation in growth, a reduced hæmoglobin index, and a low intelligence quotient. In general the amount of damage rose as the number of worms increased.

Toxicity of Anthelmintics.

When hundreds of thousands of people are treated with oil of chenopodium, thymol, or carbon tetrachloride, illnesses in which the drug is a factor are almost sure to occur, and there may even be deaths. Such accidental poisonings have been rendered less frequent by the exclusion from treatment of very young or feeble persons and those with serious chronic diseases, and also by giving purgatives with the idea of sweeping the drugs out of the intestinal tract before there has been a high degree of absorption. Even with these precautions an occasional illness and sometimes a death, occurs among the million persons, more or less, who are being treated annually under the auspices of the International Health Board and under other auspices, governmental and private.

The use of carbon tetrachloride has become widespread on account of its superiority over the other drugs in removing *Necator americanus*. Like the other vermicides, it causes occasional poisonings which have been erratic and hard to explain. They sometimes occur even when small doses are used, but they seem to happen most often when the drug has been administered to persons addicted to alcoholic drinks, especially if they drink near the time of treatment, and to children heavily infested with *Ascaris lumbricoides*. To decrease the danger, carbon tetrachloride and oil of chenopodium have been given in mixture, the dose of each being thus reduced and the danger of either type of poisoning diminished. The mixture has a further advantage over carbon tetrachloride alone in that the oil of chenopodium which it contains is highly effective in removing ascarides. In areas where alcoholism is unusually widespread, the administration of carbon tetrachloride is avoided, even in mixture.

Malaria.

Experimental control of rural malaria by intensive quinine administration did not prove successful. In the Gantt area, where quinine treatment for eight weeks was given to a large number of persons during the epidemic, there occurred a very definite reduction in the number of days lost from illness among those treated, but the following spring many of these treated cases relapsed, and so far as one could judge, the quinine administration did not check the march of the epidemic in the slightest degree. Prophylactic quinine seemed to be of some value during the epidemic, for the incidence of malaria was only 10 per cent. in those taking it, whereas it was 30 per cent. for the area as a whole. The prophylactic quinine apparently merely masked the symptoms, however.

Each of the cases of malaria reported to the health officer is visited and the diagnosis confirmed. The important fact to be determined is the source of the infection. Preliminary surveys of many counties in the Southern States have shown that malaria is not widely and evenly distributed, but appears in these counties in separate endemic foci, with the *A. quadrimaculatus* breeding-place as the geographic centre of the focus, and that each area of potential malaria has a radius of about one and one-half miles from the *A. quadrimaculatus* breeding-place.

The Anopheles breeding-places which lie within one and one-half miles of the actual cases of malaria are determined by dipping for larvæ and making catches of adult mosquitoes in their habitual resting-places. The larvæ may be differentiated on the spot by the field man. The state of Georgia prefers that the larvæ be mailed in a suitable container to the laboratory of the State Board of Health where the identification can be made by using the differential key of Paul F. Russell.

Once the endemic focus of the malaria has been determined and the breeding-place of the mosquito which is transmitting the disease has been found, the problem is greatly simplified, for efforts can be concentrated on the control of the breeding-places of this mosquito. Apart from the more fundamental drainage work, intensive effort can be limited to the months of May to October, for this is the season of *A. quadrimaculatus* in the Southern States. By determining the focus, finding the actual breeding-place of the vector, and concentrating effort upon a limited area, the *per capita* cost of control in sparsely settled areas may be reduced to a more reasonable figure.

Yellow Fever Control.

The Western Hemisphere was remarkably free from yellow fever throughout the year 1925, and this gave encouragement to the hope that eradication from the New World would soon be an established fact. Only three cases were recorded during the year, all in Brazil.*

In the absence of outbreaks, the campaign is settling down to the periodic checking up of the danger points and the investigation of every rumour of a case. At the best, years of such vigilance will still be necessary.

By the close of 1924, the infection had been brought under sufficient control in the Western Hemisphere to make it possible to release men and funds for work on the other side of the Atlantic. In May, 1925, Henry Beeuwkes, director of the new work, sailed from New York. After satisfactory conferences with the colonial authorities in London and in Paris, he proceeded to Nigeria where he established the headquarters of the Commission. By the end of 1925, he had a staff consisting of a laboratory pathologist trained under Dr. Noguchi, three physicians experienced in yellow fever control, an entomologist, an experienced sanitary inspector, an office assistant, and a laboratory technician.

The problem of first importance in West Africa is to establish the identity of the yellow fever of Africa and America. Attempts will be made to isolate the causative organism, *Leptospira icteroides*. Pfeiffer examinations of blood sera from convalescents and histological examination of tissues from fatal cases will also help to clear up any conflict of opinion regarding the nature of the cases. Furthermore, it will be necessary to define the extent and epidemiological characteristics of the infection. Surveys for this purpose have already been commenced in the Gold Coast and in two sections of Nigeria. Africa is undoubtedly the most difficult territory in which the yellow fever force has worked. Native huts are often totally dark within and it is not unusual for the occupants to bar the door and disappear when an inspector approaches. Furthermore, it is impossible to get reliable histories of illness among the natives. The African studies promise to be at once the most interesting and most challenging in the history of the yellow fever campaign.

When, ten years or so ago, the members and officers of the International Health Board surveyed the yellow fever situation, they had under suspicion an area comprising the Western Hemisphere from Mexico south to Central Brazil and the West Coast of Africa from Senegal to Angola. This zone threatened the Orient from both west and east, the chief danger being from Africa, as quarantine restrictions at the Panama Canal lessened the chance of spread across the Pacific. It is a matter of great importance, therefore, that the study of yellow fever in West Africa has now got under way.

Peking Union Medical College.

Appropriations to the amount of $888,000 were made for the regular budget of the College and its hospital.

The Peking Union Medical College is a splendid experiment. Money has been spent lavishly on

* In April and May 1926, an outbreak of yellow fever was reported from Parahyba in Northern Brazil. Cases also occurred in Natal, Bahia, and the interior. The outbreak in the coast cities was promptly brought under control, but cases were still being reported from the interior. (June 1926).

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Virol supplies those food elements so often lacking and thus restores the balance of the diet. The deficiency of one element in the food means the ineffective action of the other food elements present in the diet.

The digestibility of the vitamin-containing food is essential. It is a physiological crime to clog the system with fats that cannot be digested. Virol is assimilated with ease in the most delicate conditions.

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'BYNIN' AMARA is of special value in neurasthenia, particularly when associated with low blood pressure, anæmia and atonic dyspepsia; in convalescence it gives that impetus which often enables the system to overcome the aftermath of disease and to recover completely

'Bynin' Amara has important advantages over Easton's Syrup on account of its basis being 'Bynin' Liquid Malt in the place of syrup. The 'Bynin' Liquid Malt, besides having valuable digestive and nutritive qualities is an efficient solvent for the other ingredients and helps to mask their unpleasant taste.

COMPOSITION:

Quinine Phosphate	1½ gr.
Iron Phosphate	2 „
Nux Vomica Alkaloids equal to Strychnine	$\frac{1}{16}$ „
'Bynin' Liquid Malt	1 oz.

In bottles containing 10 oz., 20 oz. and 40 oz.

DOSE: 2 to 4 fluid drachms in water twice or thrice daily after meals.

Further particulars will be sent on request.

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building and equipment; no concession of any kind has been made to the "backwardness" of the Chinese.

Owing to the high standards insisted on the number of students admitted each year is small and the average enrolment for each year is about twelve students. The net yearly expenditure on the College is about thirteen lakhs of rupees, while the hospital costs about ten lakhs. The specially interesting feature of this magnificient institution lies in the opportunity of observing whether students who are educated on the most modern lines will be able to adapt themselves to the primitive conditions of medical practice which prevail in China to-day. In India none of us would dare to suggest the adoption of such a system, for the expenditure of 23 lakhs of rupees a year we should be expected to admit about fifty times as many students as are admitted to the Peking Medical College.

It may be suggested that the Rockefeller Foundation has aimed too high; this a fault on the right side and one which is easier to rectify than the vice of aiming too low.

India is threatened with a flood of ill-trained medical men whose training cannot give them the faintest impression of the requirements of modern scientific medicine. Our motto seems to be "quantity not quality," whereas that of the Rockefeller Foundation is "Quality and quantity." Both mottoes can be overdone, what is needed is a supply of men with a good sound training such as will fit them for the kind of work which they will be called on to carry out. We cannot imitate the Peking Union Medical College, even if we thought it desirable to do so, but we can regard it as a distant pole star showing us the direction in which we ought to travel.

Correspondence.

A CASE FOR DIAGNOSIS.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—I should be glad if any of your readers could throw any light on the following case.

On March the 15th, 1927, a Mahomedan girl, aged 5 years, in apparently good health, was brought to me by her guardian with a history that she had suffered from severe sweating, confined entirely to the head and neck, for the previous week. A month previously she had had an attack of fever which had lasted for six days.

Rickets being the only condition which I could think of as being responsible for such a condition, I made a thorough examination of the patient, but there was no sign of this disease. She appeared to be a perfectly healthy child, and no source of focal sepsis could be detected. The cardiac, respiratory, and abdominal systems were normal, and there was no enlargement of either the liver or the spleen. Her bowels acted regularly and her appetite was good. The temperature was normal, and search of a blood film failed to show any malarial parasites. I hunted through several books, including French's *Differential Diagnosis,* Hare's *Index of Symptoms,* and Manson's *Tropical Diseases,* but without finding any clue to the causation of such a condition. I prescribed santonin with castor oil.

Three days later the patient's guardian informed me that as the result of treatment she had had four liquid stools, but had passed no worms. On the 20th March I found the patient sweating so profusely from the head and neck that beads of perspiration were dropping from her in spite of the use of a handkerchief. I had given the guardian a thermometer and had asked him to take the temperature at regular intervals. On the 20th March the temperature at no time exceeded 97.6°F., and throughout the whole course of the affection she remained afebrile.

On a supposition that the condition might be due to latent malaria I next prescribed quinine with citric acid in solution. After two days of this treatment the symptoms cleared up entirely.

Can such a condition be due to malaria, or is it due to some other disease?—Yours, etc.,

BIPRA CHARAN DAS, M.B.

CHANCHAL,
24th March, 1927.

A CASE OF HÆMATURIA.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—The following case presents points of interest with regard to diagnosis.

I was called in to see a male adult patient on the first day of his illness. His temperature was 102.5°F., with a rigor present; he was passing blood-stained urine, suffering from extreme nausea and vomiting, the spleen slightly enlarged, tenderness present in the epigastrium and hypogastrium, with a pulse of 125, and a respiration rate of 35.

I gave him an injection of horse serum and an alkaline diaphoretic mixture to take, and took a blood film. In the film I found a few trophozoite forms of *Plasmodium vivax* and scanty crescents. The urine gave a strongly positive reaction for albumin, and microscopically showed tube casts and about two or three red blood corpuscles per microscope field. The same day I gave the patient an intramuscular injection of quinine and glucose-saline per rectum.

On the second day his condition was slightly improved; the urine was less blood tinged, the temperature was 101.2°F., but marked jaundice had developed. I put him on to quinine and alkalies by the mouth. On the third day jaundice was still present, with pain in the hepatic and splenic regions, but the urine had become normal in colour.

He progressed well until the tenth day of illness, when he suddenly had a rigor lasting twenty minutes. The temperature shot up to 106°F. and he became delirious. The conjunctival reflex was lost, and the pupils were dilated, though the light reflex was still present. He passed urine (of a normal colour) involuntarily, and had stertorous respiration; the pulse was 130, and respiration rate 40. Further blood films were taken and showed scanty rings of *Plasmodium falciparum* and numerous *Plasmodium vivax* forms. He was treated with quinine intramuscularly, and given iced saline per rectum.

On the eleventh day he was improving, and on the twelfth day his temperature was normal and he was recovering. He recovered by the eighteenth day and then left the neighbourhood, since when I have not seen him or heard from him.

My reasons for reporting this case are:

(1) to ask what diagnosis should be given. A similar case, reported in the *Indian Medical Journal* for December 1926, was labelled blackwater fever.

(2) the evidence of malarial infection is clear: also, despite the hæmaturia, the condition cleared up on intramuscular injections of quinine and with quinine and alkalies by the mouth. The cerebral symptoms cleared up after intramuscular quinine in a most remarkable way.

It is difficult to see what one can do except administer quinine in such cases where blood films show parasites, although quinine administration is condemned in some text-books in cases of blackwater fever.—Yours, etc.,

N. CHATTERJEE, M.B.

DOMJORE, HOWRAH DISTRICT,
4th April, 1927.

A CASE OF SURGICAL EMPHYSEMA.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—In the issue of the *Indian Medical Gazette* for February 1927, Dr. Chatterjee describes a case of acute surgical emphysema following fracture of the ribs. The following similar case, in a mental patient, may be of interest to your readers.

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A male Chinese patient, aged 52, was admitted to this hospital on the 3rd Jan., 1927, in an acutely maniacal condition. On the night of the 11th Jan., he had a fall, causing bruises all over his face, and on examination next day was found to have sustained a fracture of the 4th and 5th ribs on the left side in front, close to the nipple line. There was no hæmoptysis or cough, but the face, trunk, and arms showed well marked surgical emphysema, the lower extremities not being involved: the patient did not look "enlarged," as in Dr. Chatterjee's case, but there was a considerable amount of air in the tissues, and the patient crackled when touched.

On the 13th there was some difficulty in swallowing but no gross interference with either swallowing or respiration. In spite of sedatives he remained sleepless and restless until 1 a.m. on the 14th Jan., when he died. I may mention that he was in a very exhausted state on admission and death appeared to be due to exhaustion.

Post-mortem.—On post-mortem examination the 4th and 5th ribs were found fractured and the pleura beneath the site of the fractures torn. A small amount of dark blood was present in the pleural cavity. The surface of the lung showed only a very small puncture.

I am indebted to the Medical Superintendent, Dr. W. F. Samuels, for kind permission to publish this case.—Yours, etc.,

F. WILSON, M.B., Ch.B. (Aberdeen),
Assistant Medical Superintendent.

CENTRAL MENTAL HOSPITAL,
TANJONG RAMBUTAN,
PERAK, F.M.S.

SURGICAL DRAINAGE FOR ASCITES.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—With reference to my article in your issue for February 1927 on surgical drainage for ascites, may I encroach on your space to answer numerous enquiries which I have received?

⅔ actual size.

The attached illustrations illustrates the cannula employed for drainage, the figure being two-thirds of the actual size. It can easily be made by any local silversmith, or should any of your readers find it difficult to obtain, I shall be glad to get one made for him.—Yours, etc.,

D. N. KALYANVALA,
Chief Medical Officer, Porbandar State.

19th March, 1927.

INTRAVENOUS HEXAMINE IN MUMPS.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—I was called upon recently to treat three brothers in the same house—aged respectively 12, 9 and 5 years—suffering from inflamed parotid and sub-maxillary glands, with local symptoms and general constitutional disturbance of moderate severity. The patients were attacked one after the other within a period of four days.

In addition to antiphlogistine poultices and other local measures, I was tempted to try hexamine intravenously, having previously found this line of treatment to be of great value in a case of burns of the second degree attended with intense inflammation and suppuration. The drug is a tissue antiseptic and is non-toxic.

I could not persuade the youngest patient to have injections, but gave the eldest patient 10 grains of hexamine daily in 8 c.c. of normal saline intravenously for three days, and the second brother 8 grains in 6 c.c. of normal saline daily on two days. The injections were not followed by any serious consequence, though after each injection the patient had a mild rise of temperature with a transient rigor. The effect on the local condition was most marked, the symptoms subsiding markedly after each injection.

It appears that hexamine—like iodine—may be of value intravenously in cases of infections of unknown origin.—Yours, etc.,

BIPRA CHARAN DAS, M.B.

CHANCHAL.

PAROTITIS AS A COMPLICATION OF LOBAR PNEUMONIA.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—On the 10th February, 1927, I was called in to see a patient suffering from a typical attack of lobar pneumonia with pleurisy. The crisis occurred on the seventh day of illness.

The next day—17th Feb., 1927—he noticed a swelling below the left ear, which on examination proved to be the left parotid gland acutely inflamed. The pneumonia had been right-sided, whereas it was the left parotid gland which was affected. Ichthyol with belladonna in glycerine was applied locally and the inflammation subsided after eight days.

According to Osler's *Medicine* parotitis of this type is especially associated with endocarditis; but there was no evidence whatever in this patient of endocarditis. Parotitis as a complication of lobar pneumonia appears to be so rare that such a case should be recorded.—Yours, etc.,

RAMANIK H. DESAI, L.C.P.S. (Bombay).

SANTH PIPLI, NADIAD DISTRICT,
29th March, 1927.

VOMITING CAUSED BY MORPHIA.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—In your issue for March 1927, the article by Mr. Y. S. Rao on the above subject is interesting, though vomiting is a fairly common symptom after administration of morphia.

If he has not done so, I would recommend him to try instead Nepenthe (dose 15 to 20 drops orally administered). In my experience this drug only very rarely causes nausea, and never—so far as I know—vomiting.—Yours, etc.,

C. F. SCHAFFTER,
District Civil Surgeon.

PARBHANI, DECCAN,
26th March, 1927.

Service Notes.

APPOINTMENT AND TRANSFERS.

Major-General A. Hooton, C.I.E., K.H.P., I.M.S., Surgeon-General, Bombay, is appointed to officiate as Director-General, Indian Medical Service, during the absence on leave of the Hon'ble Major-General T. H. Symons, C.S.I., O.B.E., K.H.S., I.M.S., with effect from the date on which he assumes charge.

Colonel G. Tate, M.B., V.H.S., I.M.S., Inspector-General of Civil Hospitals, United Provinces, is appointed Surgeon-General with the Government of Bengal with effect from the afternoon of 15th March, 1927.

Lieutenant-Colonel G. Hutcheson, M.B., I.M.S., Officiating Inspector-General of Civil Hospitals and Prisons, Assam, is confirmed in that appointment, with effect from the 15th February, 1927.

Lieutenant-Colonel R. F. Baird, I.M.S., Civil Surgeon, Allahabad, is appointed Inspector-General of Civil

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Sprue

In a condition such as Sprue, in which intestinal function is impaired, the most important consideration is the easy digestibility and bacterial purity of the milk in the diet.

This factor takes on special importance when it is remembered that most authorities recommend a diet consisting of milk only, increasing to a quantity of 7 pints a day, to Sprue patients.

This is why Glaxo should be recommended in cases of Sprue. It is a milk food of exceptional bacterial purity, prepared under rigorous laboratory control. Moreover, owing to the changes in its protein during the process of manufacture, Glaxo is far more digestible than ordinary milk.

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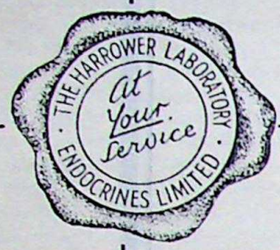

MENOPAUSE

NOTE

WHENEVER prescribing for a woman in the forties, no matter what her ailment, the possibility of endocrine imbalance should not be overlooked. Dyscrinism is more common during the forties than at any other time in a Woman's life, for it is then that the production of an important hormone ceases.

Menstrual difficulties, and with them pituitary headache, myxedema, asthenia, hypertension and various neuroses, develop upon the disturbed endocrine balance, which for approximately 30 years has been controlled by the ovarian hormone.

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supplies a part of the lacking hormones, and aids Nature in making the transition at "the critical age."

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Hospitals, United Provinces, with effect from the afternoon of 15th March, 1927.

Lieutenant-Colonel W. R. Battye, D.S.O., I.M.S., an Agency Surgeon, on return from leave resumed charge of the appointment of Administrative Medical Officer in Central India and Residency Surgeon, Indore, with effect from the 11th April, 1927.

Lieutenant-Colonel A. N. Dickson, M.C., I.M.S., an Agency Surgeon, is posted as Residency Surgeon, Hyderabad, with effect from the 8th April, 1927.

Lieutenant-Colonel J. Cunningham, I.M.S., is confirmed as Director, Pasteur Institute, Kasauli, with effect from the 3rd January, 1927.

Lieutenant-Colonel L. E. Gilbert, C.I.E., M.D., I.M.S., is appointed to officiate as Inspector-General of Civil Hospitals, Burma, with effect from the date on which he assumes charge and until further orders.

Lieutenant-Colonel J. Masson, M.B., F.R.C.S.E., I.M.S., is appointed to officiate as Inspector-General of Civil Hospitals, Bihar and Orissa, with effect from the date on which he assumes charge of his duties and until further orders.

Major H. Hingston, M.D., I.M.S., Officiating Second Resident Surgeon, Presidency General Hospital, is appointed as Surgeon to His Excellency the Governor of Bengal, with effect from the forenoon of the 28th March, 1927.

Major R. M. Kharegat, I.M.S., an Officiating Agency Surgeon, is posted as Agency Surgeon in Bundelkhand with effect from the 6th April, 1927.

The services of Major S. D. Sondhi, M.C., M.B., I.M.S., are placed temporarily at the disposal of the Government of the Punjab for employment in the Jail Department, with effect from the date on which he assumes charge of his duties.

The services of Captain A. C. Chatterjee, M.B., I.M.S., are placed temporarily at the disposal of the Government of Bengal, with effect from the date on which he assumes charge of his duties.

The services of Captain S. N. Hayes, F.R.C.S., I.M.S., are placed at the disposal of the Government of the Punjab, with effect from the 7th February, 1927.

LEAVE.

The Hon'ble Major-General T. H. Symons, C.S.I., O.B.E., K.H.S., I.M.S., Director-General, Indian Medical Service, is granted leave on average pay for six months with effect from the 8th April, 1927, or the subsequent date on which he avails himself of it.

Colonel A. Fenton, M.B., I.M.S., Inspector-General of Civil Hospitals, Burma, is granted, with effect from the 24th March, 1927, leave on average pay for 8 months pending retirement.

Lieutenant-Colonel J. Husband, I.M.S., an Agency Surgeon, is granted leave on average pay for 8 months and on half average pay for one month, with effect from the 1st March, 1927.

On being relieved of his appointment as officiating Surgeon-General with the Government of Bengal, Lieutenant-Colonel J. C. H. Leicester, M.D., F.R.C.P., F.R.C.S., V.H.S., I.M.S., is allowed leave on average pay for 6 months and 6 days with effect from the 23rd March, 1927.

The services of Colonel R. A. Needham, C.I.E., D.S.O., I.M.S., are placed at the disposal of the Government of the Central Provinces with effect from the 26th February, 1927.

Lieutenant-Colonel W. M. Anderson, C.I.E., I.M.S., an Agency Surgeon, is granted leave on average pay for 6 months under the Fundamental Rules, with effect from the 8th April, 1927.

Captain R. H. Malone, M.D., I.M.S., Assistant Director, Central Research Institute, Kasauli, is granted an extension of furlough under military rules from the 24th to 27th July, 1926, both days inclusive.

PROMOTIONS.

The promotion to his present rank of Major E. A. Penny, M.B., I.M.S., notified in Army Department Notification No. 1069, dated the 3rd August, 1923, is antedated from 29th July, 1923, to 29th January, 1923.

Captains to be Majors.

Rustom Merwan Kharegat, M.B. Dated 11th March, 1927.

John Clark Pyper, M.B. Dated 25th March, 1927.

Lieutenant to be Captain.

John Cornell Drummond, M.B. Dated 22nd February, 1927.

To be Captains.

William Dunstan Boileau Read. Dated 27th September, 1926.

John Forrest Hinksman. Dated 27th September, 1926.

John Lawler Donnelly. Dated 27th September, 1926.

To be Lieutenants.

Patrick Henry Cummins. Dated 26th August, 1926.

John Henry Clapp. Dated 26th August, 1926.

William James Leslie Neal. Dated 26th August, 1926.

John Joseph Beausang. Dated 26th August, 1926.

John Francis Bodman. Dated 27th September, 1926.

William John Anson Coldstream. Dated 27th September, 1926.

Thomas Desmond Donegan. Dated 15th October, 1926.

Thomas Anthony Malone. Dated 15th October, 1926.

Donald Page Lambert. Dated 15th October, 1926.

RETIREMENTS.

Major-General R. Heard, C.I.E., M.D., K.H.S. Dated 27th February, 1927.

Lieutenant-Colonel C. A. Gourlay, D.S.O., M.D. Dated 19th February, 1927.

Major J. G. B. Shand. Dated 22nd March, 1927.

Colonel C. H. Bensley, C.I.E., K.H.P., I.M.S., with effect from the 15th February, 1927.

Lieutenant-Colonel W. D. H. Stevenson, C.I.E., I.M.S., from the service with effect from the 3rd February, 1927.

NOTES.

"SUNLIGHT" TREATMENT.

Under the above title, Messrs. Ajax, Ltd., 117, Central Street, London, E. C. 1, have issued a book printed on art paper, and forming a concise guide to ultra-violet irradiation and actino-therapy. The book is essentially a guide for the general practitioner as well as for the specialist in this line of treatment. The action of ultra-violet rays is explained, the unit of measurement described, whilst other matters dealt with are degrees of erythema, proportionate exposure, the use of the lamp at different angles of incidence, and the skin effects. This is followed by a very complete table giving the many and varied conditions in which ultra-violet irradiation is of use, with instructions in each instance with regard to position of the patient, duration of each exposure, and frequency of applications; a table which will be very useful to the general practitioner who uses "sunlight" therapy. Two full page half tone plates illustrate the use of the method for general application.

The second section of the book deals with the installation, use and care of the apparatus; and in a technical supplement various installations for different purposes are figured and illustrated, and prices quoted. These include a hospital pattern "Ajax" lamp for collective treatment; mounted and suspension lamps for general use; a very attractive flood natural colour "sunlight" apparatus intended for the bathroom, clinics, or the nursery, for tonic treatment: portable carbon arc lamps for the treatment of local conditions; portable tungsten arc lamps, and a full page illustration of different patterns of quartz-applicators.

A third part of the volume deals with radiant heat and filtered light therapy, again with numerous illustrations

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of different apparatus. The "Ajax" radiant heat and light unit at £8-8-0 is very complete and an excellent model. Excellent also are the different local and general radiant heat and light baths, especially the cabinet bath. A full list of violet ray apparatus is also given, and a full page illustration of the "Ajax" sinusoidal generator.

The book is one which will interest both general practitioners and specialists. Its price is 4*s.* 6*d.*, plus postage.

OSTELIN.

AN interesting preparation, which is coming more and more into use in therapeutics in tropical practice is "Ostelin." This is a glycerine extract of the active principles of cod liver oil and contains the full vitamine A content of cod liver oil in concentrated and easily assimilable form. The *British Medical Journal* (6th Feb. 1926) states that experimental and clinical results indicate that Ostelin possesses the full anti-rachitic action of cod liver oil. Four drops of Ostelin are equivalent with regard to their vitamine content to one drachm of fresh and active cod liver oil.

It is obvious that the chief value of such a remedy is in the treatment of rickets, where its use is obviously preferable to that of cod liver oil. It may also be administered to the pregnant and nursing mother with great advantage, and especially so in cases where cod liver oil itself cannot be tolerated, owing to its unpleasant taste and the nausea following on its administration. Tuberculosis, kala-azar, malarial cachexia, and other wasting diseases are further conditions in which its administration is indicated—especially the first. In brief, Ostelin provides the medical practitioner in the tropics with the active principles of cod liver oil in a concentrated and easily assimilated form, eminently suitable for use in tropical climates. We have seen patients put on weight at a most satisfactory rate under Ostelin therapy. There is one point, however, with regard to which we are not entirely satisfied: occasional samples bought on the Indian market have an odour which is not possessed by the fresh product, and the question of the keeping properties of Ostelin under tropical conditions may call for investigation. It might be as well, perhaps, if the manufacturers would date their issues of this drug, since so many of the medicines bought in *mofussil* and retail shops in India are far from fresh.

BOVRIL LIMITED.

PRESIDING at the 30th annual general meeting of Bovril Limited, held on 24th February, at River Plate House, Finsbury Circus, London, E.C., the Chairman, Sir George Lawson-Johnston, said that the associations surrounding the ownership of a proprietary article were very important, and he thought it would be difficult to find any article which stood better than Bovril in this respect. The public not only valued Bovril for what it is, but had a special regard for it because the company did not raise their prices during the War, and therefore earned no excess profits. In other words, they were not war profiteers.

Bovril's actual nutritional and restorative value had become reinforced by the faith people place in it—an element of which it would be difficult to over-estimate the importance.

Last November a complete van-load of Bovril (over 20,000 bottles) was stolen from within a quarter of a mile of the distributing headquarters. The van-man was enticed by a false message to go back to the office, and the thieves drove away with his van.

He could tell them again this year that there was no "sinking feeling" about Bovril's overseas exports. Every year since the war had shown an increase upon its predecessor, and again for 1926 he could say their sales considerably exceeded those of 1925, whilst the period from January 1st to date this year showed a good increase over January and February, 1926.

The Bovril Australian estates cover a larger area than the Argentine ones—in fact, over 9,000,000 acres—and, though the cattle stock is large, it is not as great as that in the Argentine. There had been a very serious drought in Queensland, but this had not affected Bovril to any extent in the Northern Territory and Western Australia, where the Bovril Australian estates are.

The Chairman left for South America in July and returned to England in November. He spent the bulk of his time going over the properties of the Argentine estates of Bovril Limited, which now extend, including the rented *estancias*, to 1,500,000 acres, upon which there are about 250,000 head of cattle.

Sir James Crichton-Browne, thanking the shareholders for his re-election as a director, said it must, he thought, be very satisfactory to the shareholders to realise by the steadily increasing sales of Bovril that it was being more and more appreciated as a body-builder and a rampart against the incursions of disease. Several of the great scourges that afflicted us—notably amongst them influenza—were mysteries as to their efficient cause. Scientists had not yet detected the infinitely minute organism on which influenza depended, which was certainly air-borne, and swept in huge waves over vast tracts of the earth from time to time, and they had, therefore, no antiseptic, no vaccine, no serum or specific remedy by which it might be destroyed or counteracted, outside or inside the body. What they had to trust to was the power of the body to repel its attacks or hold it in check after it had effected an inroad. But that power of the body might, he believed, be greatly strengthened and augmented by Bovril.

"E. C." A CORRECTION.

On p. 298 of our issue for May, 1927, we mentioned that Messrs. Sarkar, Gupta and Co., Calcutta were manufacturing chlorine for sale by an electrolytic process. We have since received a letter from the "E. C." Manufacturing Co., Ltd., 303, Bow Bazar Street, Calcutta, who write as follows:—"We draw your attention to the fact that the letters "E. C." when used in conjunction with electrolytic chlorine, form our trade mark, which is registered in our name and has been used by us ever since the inception of the Company. Our Company is the only one that manufactures "E. C." strictly to the formula of Mr. C. M. Hutchinson, who is associated with our business."

We much regret the mistake, which was made in all inadvertence. Plant for the manufacture of chlorine by an electrolytic process is on sale, and is used in several centres in India; but the term "E. C." is protected by patent rights.

Publishers' Notice.

SCIENTIFIC Articles and Notes of interest to the profession in India are solicited. Contributors of Original Articles will receive 25 reprints *gratis*, if asked for at the time of submitting their manuscripts.

Communications on Editorial Matters, Articles, Letters and Books for Review should be addressed to THE EDITOR, *The Indian Medical Gazette*, c/o The Calcutta School of Tropical Medicine, Central Avenue, Calcutta.

Communications for the Publishers relating to Subscriptions, Advertisements, and Reprints should be addressed to THE PUBLISHERS, Messrs. Thacker, Spink & Co., P. O. Box 54, Calcutta.

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Original Articles.

FURTHER INVESTIGATIONS INTO THE ÆTIOLOGY OF EPIDEMIC DROPSY.

By HUGH W. ACTON,
LIEUTENANT-COLONEL, I.M.S.,
Professor of Pathology, Bacteriology and Helminthology,
and
R. N. CHOPRA, M.A., M.D. (Cantab.),
MAJOR, I.M.S.,
Professor of Pharmacology, Calcutta School of Tropical Medicine and Hygiene.

WE will not attempt to enter into any discussion in this paper as to whether the two diseases known as beriberi and epidemic dropsy are or are not identical, but will confine our attention to the disease known as epidemic dropsy as it occurs in Bengal. In our January 1925 paper we pointed out that these two clinical phases were due to differences in the amount of the neurotoxic and water soluble bases that occur during the decomposition of rice. The alcohol-soluble bases produce the neuritis on the one hand, and the water-soluble bases cause dropsy on the other hand. Between these two extreme grades of dry and wet beriberi, we have overlapping cases of a combination of neuritic and œdematous signs and symptoms.

In 1926 we were fortunate enough to investigate a very large epidemic of this type of dropsy that occurred in Calcutta during the months of August to November. We have no doubt that the original view that we expressed in our paper of 1925 still holds true for the vast majority of cases that occur in Bengal, except that we were not then able to explain fully some of the minor points. In this paper we will attempt to explain these, such as, how is the diarrhœa caused? What gives rise to the fever? And under certain exceptional circumstances, why does the disease appear to be infectious? Bernard at Saigon found a bacillus which was very closely allied to the one that we had described, and which we thought only infected and caused a disease in the rice. Bernard went further and also described an infection occurring in animals when fed on these bacilli. During our work, we were able to see that there was no close connection between avitaminosis and this disease; otherwise it should only occur in an epidemic form when associated with famine conditions. In Bengal epidemic dropsy is closely associated with the monsoon season.

The relationship to the rainfall.—Table I shows the death-rate figures from epidemic dropsy in Calcutta, as supplied to us through the kindness of Dr. T. M. Mazumdar, Health Officer, Calcutta Corporation. It will be seen that the disease started as an epidemic in

TABLE I.

Deaths from Beriberi in Calcutta during 1926.

March	2
April	0
May	0
June	0
July	5
Week ending 7th August	2
" " 14th "	14
" " 21st "	29
" " 28th "	17
" " 4th September	45
" " 11th "	44
" " 18th "	37
" " 25th "	73
" " 2nd October	62
" " 9th "	45
" " 16th "	67
" " 23rd "	55
" " 30th "	61
" " 6th November	66
" " 13th "	45
" " 20th "	42
" " 27th "	28
" " 4th December	32
" " 11th "	38
" " 18th "	28
" " 25th "	38
" " 1st January, 1927	34

the middle of June, and deaths began to occur in July. In the second week of August the death-rate was 14 per week and remained steadily high during September, October and November, when a decrease took place in this curve. The deaths generally take place from two to eight weeks after the appearance of the dropsy. Thus it will be seen that the endemic rate is related to the very heavy rain that occurred on the 18th of May. This storm broke in the afternoon and was followed by a fall of 1½ inches of rain. It came on so suddenly that it caught a large amount of rice that was being transported from the mills at Chetla by boat or by cart to Howrah and Kidderpore. These two areas of Calcutta were the first affected. Dr. Paul during his investigations saw a lot of this damp rice being put out next day to be dried on platforms in the sun. As a rule it takes about three weeks after the rice leaves the mill before it reaches the consumer. This would account for the epidemic which started in July, and was reported chiefly to be in Howrah and Kidderpore. The next heavy rainfall occurred on the 22nd of July; for three days it rained continuously and in the early hours of the morning a very heavy thunderstorm broke over the city. The rainfall during these three days was 1·26 inches on the 20th, 5·2 inches on the 21st, and 5·166 inches on the 22nd. During that night the whole town was flooded, and this must have caused a great deal of damage to the rice stored in many of the godowns in Calcutta. A fortnight after this the epidemic reached its height and the death rates steadily increased; in the week ending 4th September, they reached 45, and by the 25th of September 73. We see therefore very clearly how these sudden downpours caused epidemic dropsy; in roughly from two to four weeks after the flood the damaged

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rice reached the market, and about six weeks later the death rate began to increase, as it takes from two to two-and-a-half months for the consumption of the diseased rice to show its influence on the death-rate. The mortality rate from epidemic dropsy remained high during September, October and November, in spite of the fact that after the middle of October fresh cases were rarely seen. There is therefore a very close connection between these sudden floodings and the chances of the rice becoming infected in consequence.

The actual amount of rainfall is not so important, as precautions can be taken to protect the rice during transit and to remove it into a safe area outside the flood level before the rice can be damaged by the water; but humidity is of importance as it produces an excessive amount of moisture in the atmosphere, and if the rice is badly stored there is a danger of sweating and subsequent decomposition of the rice. It will be seen that the greatest damage caused to the rice is produced by the sudden pre-monsoon storms which catch the rice in transit when no provision is made to protect it from the rain. In the monsoon months, besides the humidity, it is the sudden flooding that occurs during the night owing to a very heavy rainfall that causes the damage, as the rice cannot be placed in a safe position above flood level.

The causation of fever.—During our investigations, we subjected these patients to routine cultures made from the blood, urine and stools. The blood cultures were invariably negative, showing that the disease was not due to the ordinary organisms causing septicæmia. In 20 cases the urine was examined by taking catheter specimens, and we were able to grow organisms in 9 cases. The organisms obtained on cultivation were of two types.

(*a*) Streptococci, which were undoubtedly derived from the gut as they belong to the *fæcalis, mitis* or *salivarius* type.

(*b*) Besides these cocci there were bacilli of the intestinal type.

The cultures were most successful when the urine obtained by the catheter was incubated overnight. The streptococci if present were seen growing in fine wisps in the urine, and when bacilli were present the urine became turbid. Sub-cultures were made on glucose Conradi-Drigalski's medium for streptococci, and McConkey's medium for bacilli. These findings showed that as the result of the intestinal irritation by toxins, etc., certain fæcal streptococci and bacilli were able to pass from the gut into the blood stream and be excreted by the kidney, thus explaining the fever that is very often seen in this disease, as due to a toxæmia from these intestinal organisms which are destroyed in the blood; the few that survive are excreted alive in the urine, and are passed from the body in a manner somewhat similar to the bacilluria that is seen after the enteric fevers.

Hitherto routine culture of the urine in diseases that are due to bacilli or cocci has received very little attention, except in the enteric group of organisms. The sterile cultures we obtained from the blood during the fever showed that the organisms were not multiplying, but were being destroyed and those that escaped were excreted in the urine, as occurs after the first few weeks in the enteric fevers.

Examination of the stools.—The stools were first plated on Conradi's and McConkey's media and were negative as regards any organisms resembling the rice bacillus. We next made smears from the fæces of these patients as well as a control, and stained them by Gram's stain to see if any indication was present as to an alteration in the intestinal flora of these cases. We found that in epidemic dropsy cases, the stools, when examined early in the disease, showed that the bacteria present were nearly all Gram positive bacilli (Plate I *b*), whilst in the controls the majority of the organisms were Gram negative bacilli with the ordinary Gram positive cocci (Plate I *a*). We next plated the rice bacillus on McConkey's plates, and found that it would not grow in the presence of bile salts. We then commenced cultivating these stools on ordinary agar. Out of 20 cases examined during the different phases of the disease, we were able to isolate the rice bacillus in 6 cases. These facts show that the organisms can live in the gut above the papilla of Vater, though bile salts would hinder their growth further down than the stomach. Moreover, the presence of a large number of Gram positive staining bacilli in the stools showed that many of these bacilli were actively growing or had actively grown in the gut. They were very similar in appearance to the young forms of the rice bacillus. We consider that these findings point out two things:—

(1) That ingestion of the spores alone, as would occur in the non-epidemic seasons, would not be sufficient to allow the bacillus to be implanted in the stomach and upper part of the duodenum.

(2) When actively multiplying forms are ingested, such as are seen in the rice when it is diseased in the monsoon months, it is possible that they may be implanted in the gut and be passed in the stool. Under these conditions it is possible that very intimate contact may possibly convey the infection.

In the cases reported by Dr. Anderson at Kalna, there is very little doubt that infection played a very great part in the spread of the disease in this small community. In Bengal the custom of eating from the same plate by various members of the family or intimate friends is probably the source of some of the cases that occur in non-epidemic areas when an infected member returns to his home. The disease is more commonly caused by infected grain, and

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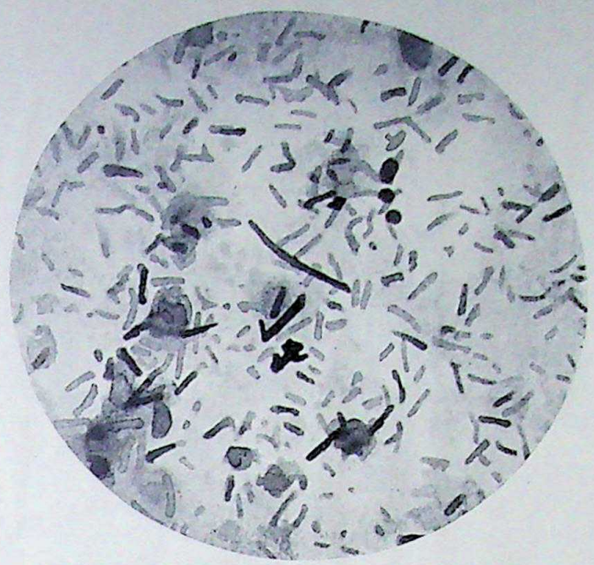
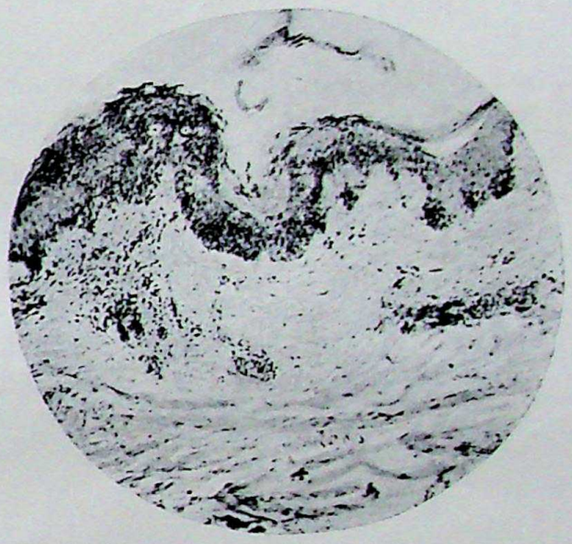
PLATE I.



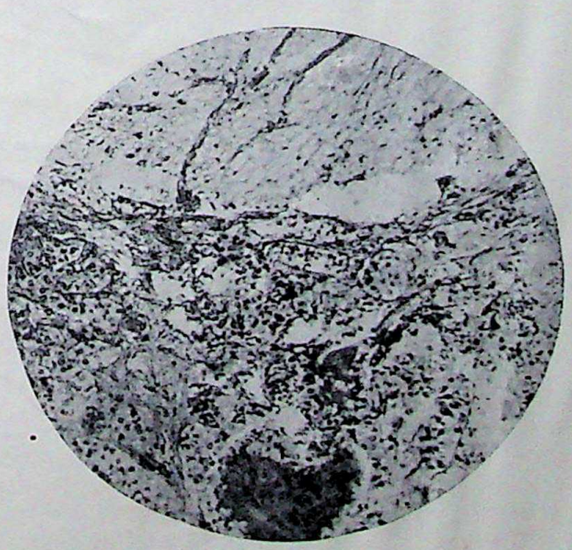
(*a*) Slide made from the stool of a healthy person and stained by Gram's stain. Note the number of Gram negative bacilli.

(*b*) Slide made from the stool of a person suffering from epidemic dropsy.

(*d*) Micro-photograph 1|6″ objective showing the dilation of the vessels in the subcutaneous tissues.



(*c*) Micro-photograph of the skin of a person who died of epidemic dropsy. (*i*) Infiltration round the subpapillary plexus. (*ii*) Round the papillary vessels.



(*e*) Micro-photograph 2|3″ objective of the pituitary gland showing (*i*) Pars nervosa.
(*ii*) Colloidal masses.
(*iii*) Pars intermedia.

(*f*) Micro-photograph of the thyroid gland 2|3″ objective. No. 6, ocular. Note the œdema between the vesicles and the lack of colloid.

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more rarely only by intimate contact with an infected person during the epidemic season.

Pathological lesions.—We were fortunate enough to get one post-mortem, which was however incomplete, as we were not given permission to open anything other than the abdomen. The following is the report on the macroscopical examination on the various organs of a case of epidemic dropsy that died in the Carmichael Hospital (*vide* Plate I).

Liver.—There was enormous congestion of the liver, and the sinusoids between the liver cells were about three times their normal size. As the result of this pressure, the liver cells had undergone degeneration and atrophy. The changes extended from the central zone of the lobule to the periphery. At the periphery of the lobule, the liver cells were normal, except for slight fatty infiltration.

Kidney.—The characteristic feature was an intertubular œdema which was shown by the separation of the tubules from each other, and a deposit of fibrin. The main effect of this œdema was seen on the convoluted tubules, which were badly stained (cloudy swelling). The glomeruli and the remaining tubules were well stained and showed no evidences of degeneration. In the medullary zone, the straight and collecting tubules were normal.

Spleen.—The spleen was mainly altered by an increased congestion, with the result that the lymphoid tissue was less evident, and the recticular tissue in it was better seen.

Lung.—There was marked desquamation of the alveolar epithelium with slight exudation of serum. This effusion of serum and desquamation had not as yet caused solidification, but was similar to that seen in capillary bronchitis. Here and there were small areas of collapsed lung.

Heart muscle.—Although the muscle fibres stained regularly and the stroma was well seen, the characteristic feature was the increased vascularity, so that the smallest capillaries were readily seen, and in a case in the Medical College many hæmorrhages had occurred in the muscle. Besides this increased vascularity, an œdema had separated the muscular fibres and made the connective tissue between them very apparent.

We are indebted to Major Hodge and Dr. Sur for kindly letting us examine the various endocrine glands, and sections of skin made from their case of epidemic dropsy at the Medical College.

Sections of the skin showed an increased vascularity in the sub-papillary vascular plexus. The vessels were easily seen, and round them was an exudation of lymphocytes and endothelial cells (Plate I *c*). Besides this vascularity, there was œdema present, which separated the white and elastic fibres of the corium. The striking point about the section made from the skin was the enormous increase in the vascularity of the subcutaneous fatty tissue; the vessels here were enormously dilated and in parts the section reminded one of nævoid tissue (Plate I *d*).

Thyroid.—The first observation when viewing the sections of the gland was the separation of the vesicles by œdema, which rendered the white fibrils particularly prominent when stained by Van Gieson's method. On looking at the vesicles one noticed great irregularity in their size and in the contents of the vesicles (Plate I *f*). As regards the size, they varied enormously, from small vesicles without any contents to large areas that were filled with lining cells. The contents of the vesicles also varied considerably; there were very few vesicles containing well formed colloid. When colloid was present, it was very frequently irregular in staining reaction and granular in appearance, owing to the presence of nuclei. In the vesicles without colloid, some were filled with large round granules which appeared to be dead and degenerated epithelium. In others, the epithelium was thrown up into folds and the cells were still staining irregularly. A fair number of the cells showed a vesicular nucleus and a few karyokinetic figures were seen, indicating that hyperplasia of the epithelium was taking place in these vesicles. There was therefore a diminution in the formation of thyroid colloid and hyperplasia of the epithelium. The vessels between the alveoli were dilated.

Parathyroid.—There was no change in the structure of the parathyroid gland.

Pituitary gland.—The pars anterior showed numerous sinusoids filled with blood, which were stained a brownish yellow at the periphery, but as one proceeded inwards the red blood cells stained a deep red. In this area the colloid of the vesicles was very scanty. The cells forming the vesicles were chiefly basophile, but here and there were seen large oxyphiles. A few chromophores were seen between the vessels. This section did not go through the pars tuberalis.

Pars intermedia.—In the region of the pars intermedia the cells were more basophile, and here and there were large masses of deeply stained colloid. These vesicles were seen as far as the pars anterior. In the region of the interglandular cleft very large spaces containing colloid were seen and in one or more of them the colloid appeared to form the lining of a sinusoid. It appeared that when the red blood cells came in contact with the colloid they became altered and stained a deep red with eosin (Plate I *e*).

Pars nervosa.—In this area, near the pars intermedia, were masses of colloidal material known as Herring's masses; otherwise the cells were normal.

Suprarenal.—The sections were made mainly through the cortex and included very little medulla. The columns of characteristic cells were separated from each other by an œdema and were broken up into smaller masses. The cells in the area were regularly stained, and did not

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have the usual appearance of the small vacuoles normally seen in the cytoplasm.

CONCLUSIONS.

(1) There is a close association between epidemic dropsy and the wetting of rice by sudden storms or flooding which allows decomposition to start in the rice, and then produces these poisonous bases.

(2) The excessive humidity that occurs during the monsoon months is also dangerous when rice is stored in stacks and in ill-ventilated godowns.

(3) The diarrhœa that is produced is due to the action of these water-soluble bases causing œdema of the mucous membrane and exfoliation of the epithelium.

(4) The damaged mucous membrane now allows the intestinal cocci and bacilli to invade the blood stream and thus produce the fever.

(5) These organisms can be found in the urine by suitable methods of culture.

(6) The stools in the acute stage of the disease show large numbers of Gram positive organisms.

(7) The rice bacillus can be cultivated from the stools of these cases, provided the medium contains no bile salts.

(8) It is possible that infections may occur of the stomach and duodenum by these organisms, and under rare conditions the disease may be spread from person to person when contact is intimate.

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Anderson, I. R. An apparently infectious outbreak of the Epidemic Dropsy form of Beriberi. *Indian Medical Gazette*, February, 1927.

A NEW SEROLOGICAL TEST FOR KALA-AZAR.

By L. EVERARD NAPIER, M.R.C.S., L.R.C.P. (Lond.),
Calcutta School of Tropical Medicine.

RECENTLY, Major R. N. Chopra, I.M.S., Professor of Pharmacology at the Calcutta School of Tropical Medicine, whilst carrying out some pharmacological experiments with antimony compounds, noticed that when the serum from a kala-azar patient was added to certain of the pentavalent compounds of antimony a heavy precipitate was formed. He found that this precipitate was not formed if normal serum was added to any of these compounds, or if a kala-azar serum was added to sodium antimony tartrate.

These observations naturally led one to compare the value of this phenomenon with that of the aldehyde test as a diagnostic method for kala-azar.

Before deciding on any special technique there were a number of points to be settled, namely, the compound to be used, the strength of the solution, and the proportion of serum to solution.

Experiment I.—Urea-stibamine was the first compound with which investigations were made. The sera of two patients who were suffering from well-developed kala-azar were taken; the blood had been drawn on the previous day and placed in the cool incubator overnight. Two rows of 7 test-tubes were placed in a rack; into the first six of each row 2·5 c.c. of urea-stibamine solution of different strengths was placed and into the other distilled water; two drops of one sample of serum were added to each tube of one row and two drops of the other serum to the tubes of the other row. The results which were the same in each row are shown in the following table:—

TABLE I.

Strength of solution.	*Immediate result.*	*Subsequently.*
Per cent.		
4, 2, 1	Heavy flocculent precipitate.	Precipitate settled, but complete settlement delayed for some time.
0.5, 0·25	Heavy flocculent precipitate.	Precipitate settled in about 10 minutes leaving clear supernatant fluid.
0.125	Light flocculent precipitate.	Delayed settlement.
0.0625	Milkiness of serum.	Some settlement but cloudy serum remained.
Water	Slight milkiness.	

Although a definite precipitate appeared with the more dilute solutions the viscosity of the mixture appeared to stop rapid settlement, so that the clearest-cut results were given with the 0·5 per cent. and 0·25 per cent. solutions. For the sake of economy the latter was chosen and the tests repeated with this strength of solution and a number of freshly-drawn sera from kala-azar patients. I was somewhat surprised to find that only a light precipitate formed in most instances. One of these "positive" sera was chosen; it was tested against six different strengths of solution and the test repeated after the serum had been kept 24 hours. The following were the results obtained:—

TABLE II.

Strength of solution.	*Serum 1 hour after withdrawal.*	*24 hours after withdrawal.*
Per cent.		
4	Heavy flocculent precipitate.	Heavy flocculent precipitate.
2	Heavy flocculent precipitate.	Heavy flocculent precipitate.
1	Heavy flocculent precipitate.	Heavy flocculent precipitate.
0.5	Light flocculent precipitate.	Heavy flocculent precipitate.
0.25	Fine precipitate.	Heavy flocculent precipitate.
0.125	Milkiness of solution.	Light flocculent precipitate.

It was thus obvious that if a freshly-drawn serum were to be used a stronger solution of

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antimony solution must also be used. A 1 per cent. solution appeared to give satisfactory results.

Experiment II.—3 c.c. of a 0·5 per cent. solution of urea-stibamine was placed into each of 7 test-tubes and varying quantities of serum were added, as follows:—

Tube	A,	B,	C,	D,	E,	F,	G.
c.c. of serum	0·04,	0·08,	0·12,	0·16,	0·2,	0·24,	0·48.

In every instance a precipitate formed. The precipitates were allowed to settle; after two hours they were measured roughly and it was found that they increased according to the amount of serum added but that the precipitates in the last three appeared to be about equal.

The supernatant fluid from tube E was drawn off and divided into two equal parts; to the first tube 1 c.c. of urea-stibamine solution was added and to the other two drops of serum from a kala-azar patient. The supernatant fluid from tube G was treated in the same way. The results obtained were as follows:—

TABLE III.

Tube.	Contents	Result.
W.	Supernatant fluid from E+ serum.	Precipitate.
X.	Supernatant fluid from E+ antimony solution.	No precipitate.
Y.	Supernatant fluid from G+ serum	No precipitate.
Z.	Supernatant fluid from G+ antimony solution.	Precipitate.

It is thus obvious that in the supernatant fluid from tube E there remained some of the reacting substance of the urea-stibamine, but that the reacting substance of the serum was all absorbed; and, *vice versa,* that in the tube G the reacting substance of the urea-stibamine was all used up, but that there remained some of the reacting substance of the serum. Or, that in tube E there had been an excess of urea-stibamine and that in tube G there had been an excess of serum.

Thus in this strength of solution, somewhere about 0·3 c.c. of serum combined with 3 c.c. of 0·5 per cent. solution, i.e., 15 mgm. of urea-stibamine. Therefore, the maximum effect will be produced by mixing urea-stibamine solution and serum in this proportion.

Experiment III.—A large sample of serum from a patient suffering from well-developed kala-azar was kept for 24 hours in the cool incubator. Six rows of seven tubes each were placed in test-tube racks; into each row 2 c.c. of six different dilutions of one pentavalent compound were placed, and into the 7th tube 2 c.c. of distilled water. To each tube two drops—about 0·08 c.c.—of serum was added and the tube agitated to complete mixing. Table IV below shows the results of this experiment.

TABLE IV.

	1%	0.5%	0.25%	0.125%	0.0625%	0.03125%	Water. Milkiness.
von Heyden 693 ..	H.F.P.	H.F.P.	H.F.P.	H.F.P.	L.F.P.	Fine precip.	
Aminostiburea ..	L.F.P.	H.F.P.	H.F.P.	H.F.P.	Fine precip.	Milkiness.	
Stiburea (urea-stibamine) ..	H.F.P.	H.F.P.	H.F.P.	L.F.P.	Fine precip.	Milkiness.	
Stibosan	No precip.	No precip.	Milkiness.	L.F.P.	Fine precip.	Milkiness.	
Stibamine glucoside ..	L.F.P.	Fine precip.	Milkiness.	Milkiness.	Milkiness.	Milkiness.	
Novostiburea ..	No precip.	No precip.	Milkiness.	Milkiness.	Milkiness.	Milkiness.	

H.F.P.=Heavy flocculent precipitate. L.F.P.=Light flocculent precipitate.

This experiment was then repeated with normal serum in the place of kala-azar serum. The results are not worth reporting in tabular form as in no instance was a precipitate formed.

Thus the reaction occurs with five of the six compounds tested. In the case of each one of these compounds the test has been carried out a number of times with different sera, both kala-azar and non-kala-azar, and the results have been more or less in keeping with those shown in the above table. Novostiburea gave a fine precipitate in some dilutions with some of the sera tested.

In the case of the stronger solutions of Stibosan the precipitate appears to re-dissolve.

It is a very interesting fact that the order of arrangement of the various compounds according to their reacting power—judged by the reactions in the weaker solutions—is the same as the order of arrangement according to my own estimate of the therapeutic value of the various compounds in the treatment of kala-azar; thus, No. 693 is apparently the most powerful compound that I have yet used in the treatment of kala-azar, and Novostiburea is certainly the weakest of the six compounds in this respect.

This fact may be a coincidence; on the other hand the curative power of a compound and the reacting power may be dependent on the same factor. If the latter be the case, this reaction may prove to be a laboratory method of estimating the curative value of any compound and, further, it may give us some indication of which is the particular factor which makes one pentavalent compound of antimony so much more efficacious than another in the treatment of kala-azar.

The technique.—If this test were to be used as a diagnostic method it was essential that a

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standard technique should first be adopted and then that its reliability should be tested by applying it in a number of cases in which the diagnosis had been checked by spleen puncture, or some other positive means of diagnosis.

The strongest reaction occurred with No. 693, but unfortunately only a very small quantity of this product was obtainable at the time, so urea-stibamine (Stiburea brand) was used throughout. The weakest dilution in which a clear-cut result occurred was 0·25 per cent., so, in the interests of economy, this was the dilution selected. It had been estimated that 0·1 c.c. of serum reacted with 5 mgm. of urea-stibamine, so the proportion selected for this test was 2 drops—nearly 0·1 c.c.—to 2 c.c. of a 0·25 per cent. solution—i.e., 5 mgm. of urea-stibamine.

A small sample of the patient's blood was taken—an amount sufficient to produce 2 drops of serum—and placed in the cool incubator, or left on the laboratory table, overnight. A 0·25 per cent. solution of urea-stibamine in distilled water was prepared and 2 c.c. placed in a test-tube; to this two drops of serum were added, the tube agitated and allowed to remain on the laboratory bench for 10 minutes, after which the first reading was taken; a second reading was taken in about 2 hours time.

The reactions which occur and the signs which have been adopted are given below:—

A very heavy flocculent precipitate, separating immediately and leaving a clear supernatant fluid. +++

A heavy flocculent precipitate, separating within 10 minutes and leaving a clear supernatant fluid. ++

A light flocculent precipitate, separating within two hours, leaving a clear supernatant fluid. +

A fine flocculent precipitate, separating within two hours and leaving a milky solution above. (+)

Milkiness of the solution which may separate in 24 hours. (±)

A clear solution, no precipitate. —

The test was carried out in 60 cases in which kala-azar was suspected on clinical grounds. In every instance an aldehyde test was also done and the diagnosis confirmed by spleen puncture, or by some other positive means of diagnosis. Forty-four of the cases proved to be kala-azar and in the remaining 16 at least one spleen puncture was "negative." Spleen puncture is not an absolutely final means of diagnosis but the chances are that not more than one or two of these 16 cases were kala-azar. Table V gives the results of these tests; the signs adopted for the aldehyde reactions being those suggested by me (1922).

It will be seen that the results of the two tests are almost exactly parallel throughout; most of the differences in the results can be attributed to differences in the value of the signs adopted. The aldehyde test is a non-specific test, that is to say, its result is not dependent on the actual presence or absence of the specific organism, and as has been repeatedly pointed out, it is mainly of value when the result is definitely "positive,"

TABLE V.

Serial number.	Aldehyde reaction.	Antimony test.	Diagnosis.
1.	(+)	+	Leishmania present.
2.	+++	+++	" "
3.	(—)	—	Spleen puncture—ive.
4.	+	+	Leishmania present.
5.	+++	+++	" "
6.	+++	+++	" "
7.	+++	+++	" "
8.	(±)	(±)	Spleen puncture—ive.
9.	+	+++	Leishmania present.
10.	—	(±)	Spleen puncture—ive.
11.	+	+	Leishmania present.
12.	(+)	(±)	Spleen puncture—ive.
13.	+++	+++	Leishmania present.
14.	++	+++	" "
15.	(+)	+++	" "
16.	(+)	(+)	" "
17.	(±)	++	Spleen puncture—ive.
18.	+++	(+)	Leishmania present.
19.	+	+++	" "
20.	(+)	+	Spleen puncture—ive.
21.	++	(±)	Leishmania present.
22.	+++	++	" "
23.	+++	+	" "
24.	+	+++	" "
25.	(+)	(±)	" "
26.	+++	++	" "
27.	+++	++	" "
28.	(+)	+++	" "
29.	(±)	+	Spleen puncture—ive.
30.	(+)	(+)	Leishmania present.
31.	(+)	++	" "
32.	+++	+++	" "
33.	++	++	" "
34.	(—)	(+)	Spleen puncture—ive.
35.	+	+++	Leishmania present.
36.	(±)	(±)	Spleen puncture—ive.
37.	+	+++	Leishmania present.
38.	+++	+++	" "
39.	(±)	(±)	" "
40.	(+)	(±)	" "
41.	—	—	Spleen puncture—ive.
42.	(+)	(+)	Leishmania present.
43.	+++	+++	" "
44.	—	—	Spleen puncture—ive.
45.	++	+	Leishmania present.
46.	+++	(+)	" "
47.	—	—	Spleen puncture—ive.
48.	(±)	+	" "
49.	+++	+++	Leishmania present.
50.	(±)	(±)	" "
51.	—	—	Spleen puncture—ive.
52.	++	+++	Leishmania present.
53.	+++	++	" "
54.	+++	+++	" "
55.	(±)	(±)	Spleen puncture—ive.
56.	(+)	—	Leishmania present.
57.	(+)	—	" "
58.	(+)	(+)	Spleen puncture—ive.
59.	+++	+++	Leishmania present.
60.	(±)	(±)	" " "

the result not being "positive" in the early stages of the disease, but at this time of year—March and April—when early cases are rare, negative

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results acquire some value. An analysis of these results is given in Table VI.

TABLE VI.

Result.	Aldehyde Reaction.		Antimony test.	
	Leishmania present.	Spleen puncture "negative."	Leishmania present.	Spleen puncture "negative."
+++	18	0	20	0
+	5	0	7	0
+	7	0	7	1
+)	11	2	3	3
(±)	3	7	5	7
−	0	7	2	5
	44	16	44	16

If we take all results down as far as (+) as "positive" and the rest as "negative" an analysis of the aldehyde test results shows that of 43 "positive" results two were in cases which were never proved to be kala-azar, and of 17 "negative" results 3 were in cases which were kala-azar; and if the same rule be applied to the antimony test results we see that of 41 "positive" results 4 were in cases which were never proved to be kala-azar and of 19 "negative" results 7 were in cases which were kala-azar.

Taking individual cases, the result in cases Nos. 16 and 25 were much more definitely "positive" with the antimony test than with the aldehyde test, whereas the reverse was the case in Nos. 46, 56 and 57. It is very seldom that a case in which the aldehyde reaction is + turns out not to be a case of kala-azar, so that a + or stronger result has a very high diagnostic value. In this series the 27 cases in which the antimony test was ++ or +++ were all cases of kala-azar but in one instance a case in which the reaction was + the spleen puncture was "negative." It seems advisable, therefore, to look upon the ++ and the +++ results only as definitely "positive." Thus, in this series the antimony test gave a "positive" diagnosis in 27 cases against the aldehyde test's 30, that is to say the tests are for all practical purposes of equal value.

Controls.—Only a small series of controls, other than the 16 cases in the above series, have been done. Twenty cases suffering from diseases other than kala-azar were tested and in no case was a "positive" result obtained. In addition to these, the serum of 20 lepers was tested both by the antimony and by the aldehyde test; in 4 instances the aldehyde test was (±) and in one of these the antimony test was also (±), but the rest of the tests were definitely "negative."

The test with freshly separated serum.—There are obvious practical disadvantages in waiting 24 hours before performing the test. In a large number of cases reported in the above table the serum was also tested within an hour after withdrawal against a 0·1 per cent. solution of the antimony compound; the results were almost identical with those subsequently obtained with the 24-hour-old serum against a 0·25 per cent. solution. An attempt to carry the test further and use freshly drawn blood was not successful; not only did the hæmoglobin cloud the result but in a number of cases no precipitation occurred when the blood in a well-developed case of kala-azar was used.

No attempt has been made to work out the rationale of the test or to investigate the nature of the reaction that occurs. One observation however, has been made, namely, that if normal or "negative" serum be added to the antimony solution its presence almost completely retards the reaction when a "positive" serum is subsequently added.

CONCLUSIONS.

The above-described reaction occurs with a number of pentavalent antimony compounds and the intensity of the reaction appears to vary according to the therapeutic efficiency of the compound used.

The diagnostic value of this test appears to be equal to that of the aldehyde test, but further experience is necessary.

It has two distinct advantages over the aldehyde test, namely, that only a small quantity of serum is required, and that a clear-cut result can be obtained when the serum is milky, as is often the case with children's serum.

The test is best performed by adding 2 drops of a 24-hour-old serum to 2 c.c. of a 0·25 per cent. solution of Stiburea, or 2 drops of freshly separated serum to 2 c.c. of a 1 per cent. solution of Stiburea, agitating and leaving on the laboratory bench for 10 minutes. If the serum is from a patient suffering from kala-azar a heavy flocculent precipitate will form which will separate within 10 minutes, leaving a clear supernatant fluid.

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THE FOOD VALUE OF THE NUT OF *TRAPA BISPINOSA.**

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Trapa nut, the water nut, *paniphal* or *shingara* of Bengal, the *sringatak* of Sanskrit, has long

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been in use, especially as a food for invalids. As it forms a supplementary staple food in Manipur and yields to Kashmir State a revenue of a lakh of rupees a year, Rai B. A. Gupta Bahadur, F.Z.S., Assistant Director of Ethnography, Calcutta, strongly advocated extension of its cultivation in Bengal. Sir George Watt(1) also recommends it on the ground "that in a bad season this large adventitious source of food-supply would form a stand-by, when the other crops might fail altogether." We also learn(2) that a correspondent of the Agri-Horticultural Society of India earnestly suggested that all fresh-water lakes, tanks and jhils in the Madras Presidency, including the scene of the last terrible famine, should be systematically planted with "the water nut of the Bengal Presidency," and that Baron Ferdinand von Muller of Melbourne, on reading this communication, took steps to obtain seed nuts from Calcutta and that Australia now possesses water nuts with which all her fresh-water lakes will gradually be planted and an inexhaustible supply of a wholesome food secured.

Identification.—We may first deal with the identification and cultivation of the plant. As to the first, it seems to be confounded with '*kesur*,' another aquatic plant growing in this province. This plant, *Scirpus kysore R.*, is a Monocotyledon belonging to the genus *Scirpus* of the natural order Cyperaceæ; it is the water chestnut of Bengal, a large bush bearing trigonal nuts, the tubers of this plant forming the edible part, a diet also particularly indicated for the

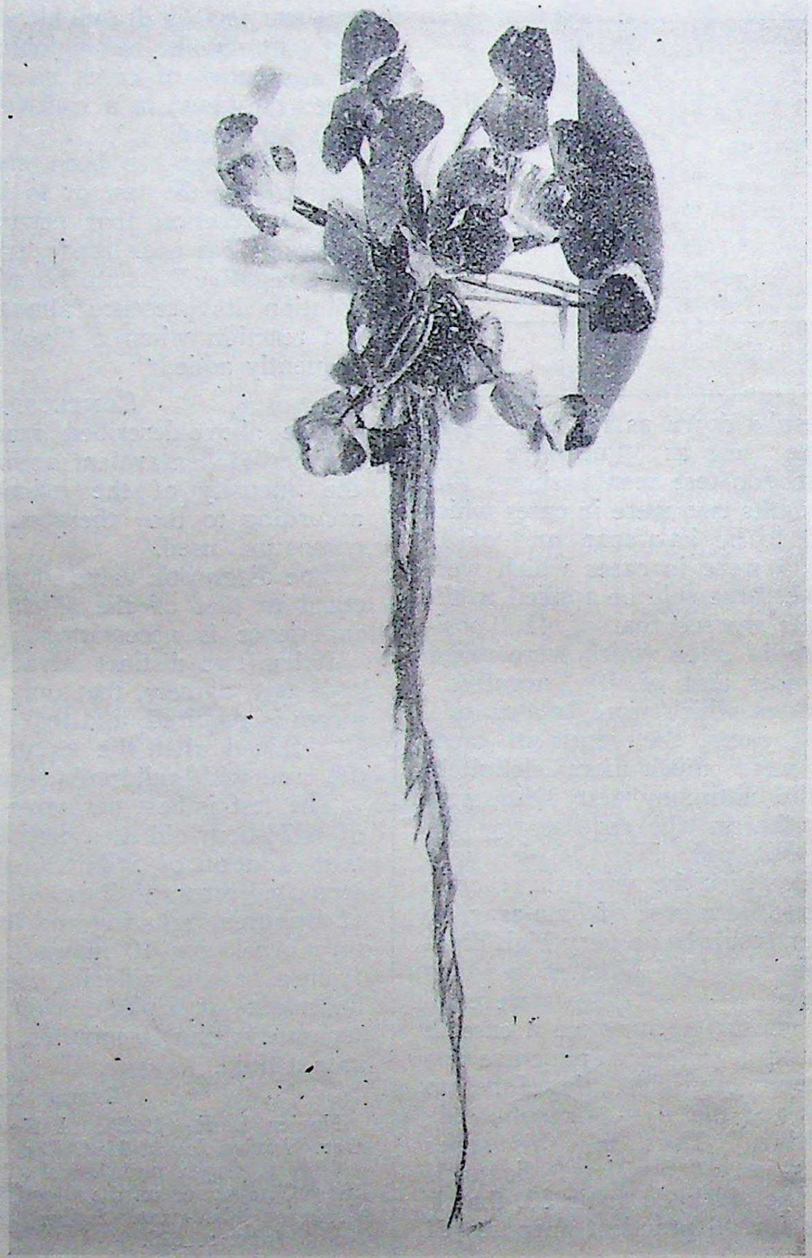

Fig. 1.—*Trapa bispinosa* plant growing in water with leaves expanded.

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invalid. Its relative(3), the water chestnut of China, the *pitsi* or *maatai* was transported from Canton to the Botanical Gardens, Bengal, where it blossoms about the close of the rains. The plant which we are dealing with however is *Trapa bispinosa* of Roxburgh(4), the water nut of Bengal.

It is a calycifloral Dicotyledon belonging to the genus *Trapa,* natural order, Onagraceæ. It is a floating water herb, perennial in deep waters, becoming necessarily annual in shallow pools and lagoons which dry up during the prolonged drought of this country.

villous, containing many inflated vessels, and a swelling near the apex, making the whole plant buoyant. It also shows pure white flowers, axillary, solitary, pedunculated, with four sepals, connate, four petals, small and white, and four stamens. The carpels form a two-celled ovary with ovule solitary in each cell. The fruit is the nut, ovoid, bony, with four prominent angles, two of which are spinescent and the beak apical, perforate for the exit of the radicle. A native of Bengal, it grows in all other Provinces of India. Of the chief varieties, the *basmati,* a small nut with one-third of kernel to two-thirds

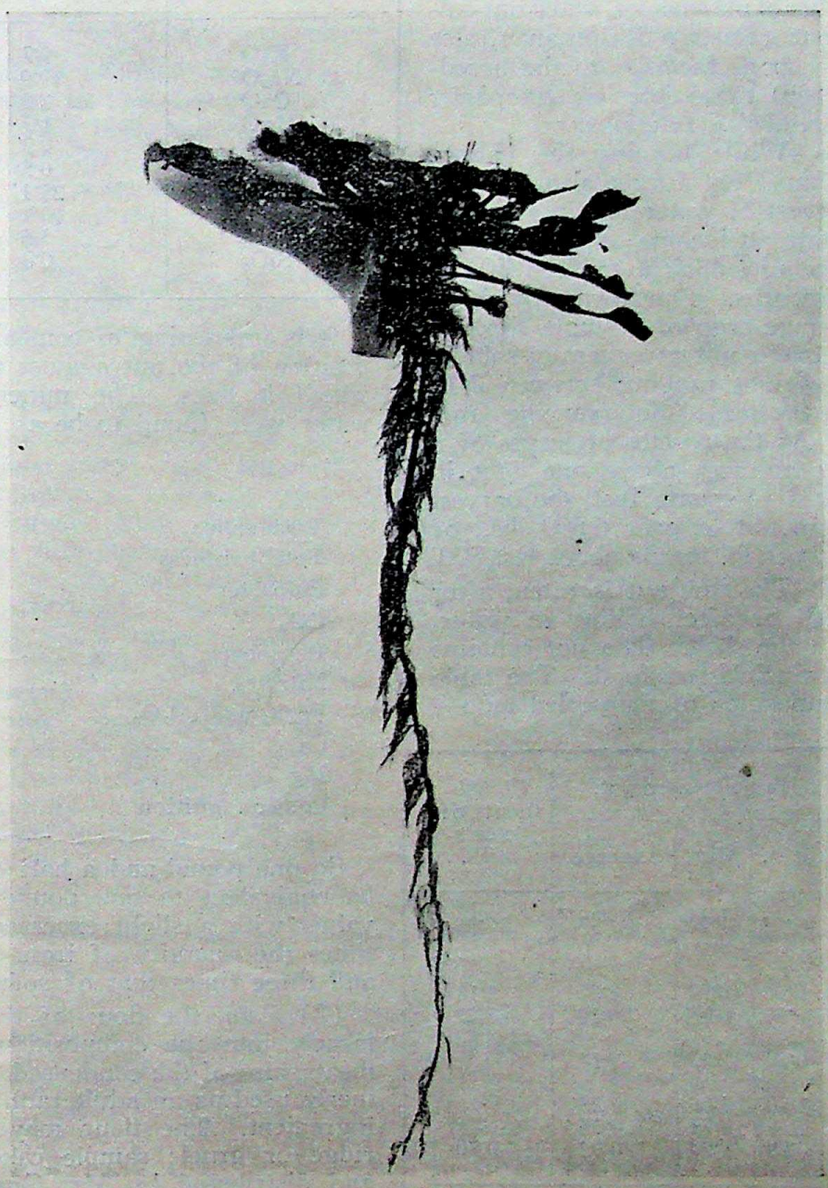

Fig. 2.—*Trapa bispinosa* plant growing in water with leaves closed.

Figure 1 shows a full grown shoot, stoloniferous, about 3 ft. long, floating, with leaves dimorphic, the submerged being rootlike, pinnatipartite, opposite, the floating being rosulate, alternate, reniform, with posterior margin entire, and the anterior, serrate dentate, the petiole

of shell is the best, the *dogree* is larger with a thicker shell, and the *kangar* has the best kernel, the shell being very thick and spinous. Among the allied species are *Trapa quadrispinosa,* (*natans*) of Chittagong and Sylhet, with all four angles spiny instead of only two of the *bispinosa,*

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and *Trapa bispinosa* var. *incisa* of Chota-Nagpur, with floating leaves much smaller and incised-serrate anteriorly.

Limits of cultivation.—As to the limits of its cultivation, we must remember that its growth favours larvæ of mosquitoes and among them of the malaria-carrying Anopheles. The two species that were found associated with the plant by Mr. Iyengar, Entomologist to the Bengal Public Health Department in December, 1924, i.e., when the season most favourable for these mosquitoes in Bengal was over, were *Anopheles fuliginosus* and *Anopheles sinensis.* Dr. Khambata, Officiating Director of Public Health, Bengal, in his experience of water nut cultivation in Bharatpur (Eastern Rajputana), also finds that it affords great facilities to the breeding of such dangerous mosquitoes as *Anopheles culicifacies* and *Anopheles fuliginosus.*

Economic value.—While keeping the above facts in mind, we must not forget also the fact that the annual harvest of water nut in Kashmir brings in to the State an income of £12,000, the quantity obtained being sufficient to feed 30,000 persons for three months. Our own experience shows that the average crop of a single shoot is ½ lb. The tender green nut as generally sold in the market has a weight ranging between 2·18 gm. and 13·6 gm., the peeled nuts varying from 1·45 to 6·20 gm. As the rosette of leaves of a shoot spreads over an area above one foot in diameter, i.e., about 3·14 square feet, the harvest of one acre will amount to over 6,500 lbs., of nuts, which at 2 as. per lb. means about Rs. 800.

Food value.—(1) The raw nut is eaten, after peeling, either fresh or after boiling in water, or after roasting in the shell. The nut contains all the proximate principles of food. The table below gives the composition of the peeled nut:—

Constituents.	Peeled water nut.			Constituents of cow's milk.
	Min.	Max.	Average.	
Water ..	66·05	87·70	84·58	87·53
Proteins (N by Kjeldhal process X 6·4) ..	0·98	3·97	2·37	3·18
Fats ..	0·18	0·18	0·18	5·27
Carbohydrates ..	...	..	..	4·32
Starch ..	6·74	12·17	9·14	..
Soluble carbohydrates ..	1·50	3·00	2·25	..
Fibre ..	0·39	0·71	0·56	..
Ash ..	0·70	1·20	0·92	0·70

The fifth column shows the percentages of the food principles of milk as against those of the nut, being the averages of the value of 25 samples of cow's milk analysed of late. In proteins, it is poorer than the milk by 34 per cent.; it is very poor in fats but the digestible carbohydrates in the nut are 11·39 per cent. as against 4·32 per cent. in milk, an excess of 62 per cent. The total calories of fat and digestible carbohydrates per 100 grams of nut is 48·37 against 66·72 of the same fuel principles in 100 grams of milk, a deficit of 38 per cent. The aggregate heat value of the nut, excluding fibre, is 58·19 calories per 100 grams as against 79·76 of milk, i.e., less than the latter by 37 per cent. The mineral matter in the nut exceeds that in the milk by 24 per cent. The following table shows the percentages of the different bases and acids in the ash of the nut against those of the milk.

	Trapa nut.	Milk.(5)
K_2O	9·7	24·5
Na_2O	19·9	11·0
CaO	2·5	22·5
MgO	1·7	2·6
Fe_2O_3	0·9	0·3
MnO	0·5	..
P_2O_5	25·1	29·5
SO_3	13·1	1·0
$CaCl_2$	3·6	15·6
SiO_2	0·8	..

It is interesting to compare the mineral composition of the nut against that of the water in which it lives. The mineral matters in such water were found to be as follows:—

	Maximum.	Minimum.
Total solids	61·4	22·4
Total hardness .	19·0	10·0
Chlorides ..	13·8	3·9
CO_2	13·6	6·3
Phosphates ..	Trace.	Trace.
Nitrates	Present.	Nil.
Fe_2O_3 and Al_2O_3 ..	0·74	Trace.
Ca	5·35	3·3
Mg	2·4	1·5
Loss on ignition ..	3·0	0·4

So one pound and a half of the *trapa* nut will be equivalent to one pound of milk in energy value, with a slight excess of phosphorus, four times the quantity of iron, half that of potash, and three times that of soda.

(2) *Palo,* the flour of the nut, enters fairly largely into the composition of Bengali sweetmeats, also of the condensed milk called *khir,* formerly used as an adulterant, but now as a usual ingredient. The flour may be made into porridge or gruel: sample cakes prepared with it and distributed by Mr. Gupta to the Commissioners of the Food Products Exhibition held in Calcutta in 1921 were pronounced unanimously to be delicious. The meal is a food of the farinaceous group and compares very favourably with such articles as arrowroot, sago, barley, and rice. The values given by Col. D. McCay in his "Treatment of Diabetes in India" in the *Indian Journal of Medical Research,* are proteins 2·5, carbohydrates 22·5, fats a trace, calories 100.

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The findings in our laboratory were as follows:—

Constituents.	Trapa nut flour.			Figures of other Foods.				
	From local markets.	Prepared in our laboratory.	Mean value.	Arrowroot.	Sago.	Barley.	Rice.	Wheat flour.
Moisture ..	12·06	11·97	12·02	15·40	14·00	14·30	10 00	16·50
Proteins ..	8 65	8·81	8·73	0·80	0·80	12·70	5 00	13·00
Fats ..	0·71	0·65	0·68	..	..	2·00	0·10	1·50
Carbohydrates ...	75·85	76·97	75·90	83·50	15·05	71·10	84·40	68·30
Ash ..	2·73	2·66	2·66	0·30	0·15	3·00	0·50	0·70

As a farinaceous food for ordinary conditions water nut flour is superior to rice, being richer in protein by 42 per cent.; both contain very little fat, still the amount with the former is 7 times that in the latter; in mineral matters the nut meal is 5 times as rich as rice. As an invalid food it is superior to sago, arrowroot, and cassava in nutriment, and though a little inferior in this respect to barley, it is much more digestible and therefore better suited to the sick dietary than the latter.

(3) *Influence on nutrition.*—We had no time or facilities for investigation of the vitamines in these nuts. Feeding experiments on animals started with a view to gauging its nutritive value had made but little progress when this paper was written. We began with three guinea-pigs; two of these were killed by rats, and the remaining one was severely mutilated; the animal's wounds healed completely and it regained weight on an exclusive water nut diet. As to three more guinea-pigs with which we resumed the investigation they continued quite active; the oscillation in their weight at the end of the third week was found to be due to their getting the nut in insufficient quantity. On the supply being increased they gained in weight rapidly.

Result of feeding guinea-pigs exclusively on *trapa* nuts.

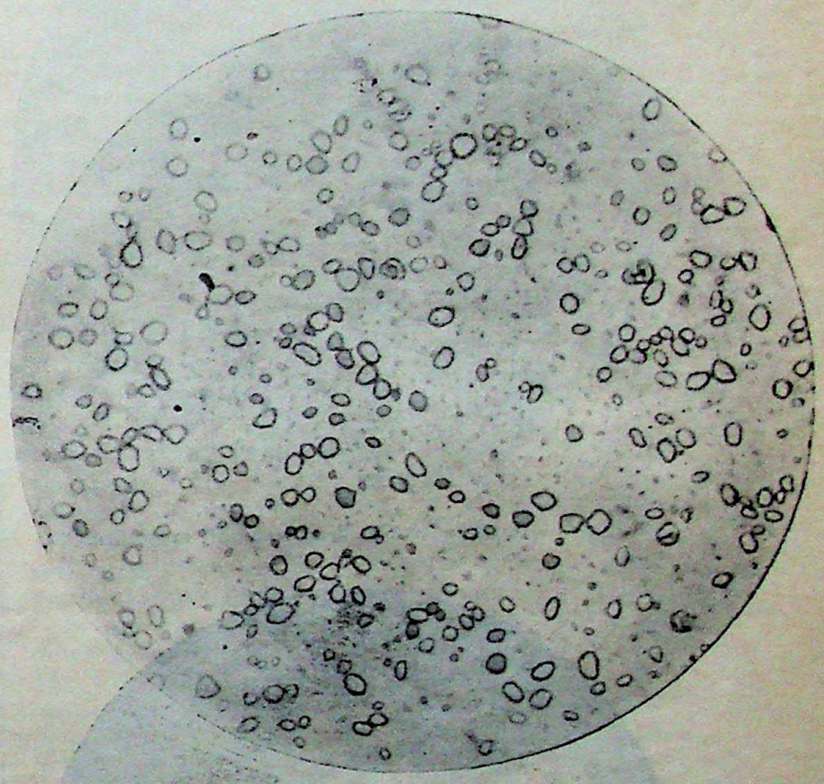

Fig. 3.—Starch grains of *Trapa bispinosa*, by transmittted light.

Animal.	Weight in Grammes on						
	27-10-26.	28-10-26.	3 11-26.	10-11-26.	11-11-26.	18-11-26.	24-11-26.
Guinea-pig mutilated on 28-10-26.	539	..	450	..	460	420	460
Guinea-pig No. 1 ..	..	500	..	500	540	480	510
" " 2 ..	..	460	..	420	440	460	440
" " 3 ..	.	450	..	400	410	370	410

(4) *Medicinal value.* *Bhabaprakas* and other medical literature of ancient India claim for the nut the virtues of being an alterative, aphrodisiac, and astringent. As we have seen above it is rich in iron and as such may probably act as a hæmatinic; the excess of phosphorus also may have a beneficial influence on the system.

(5) *Characteristics of the trapa starches.*—The most important nutrient in the nut is of course its starch. This starch has apparently hitherto not been studied, so we give photos of it, one in ordinary and the other in polarised light (Figs. 3, 4 and 5).

The granules are quite characteristic, being oval with a diameter of 30 to 40 per cent.; having a pointed hilum at the centre and marked

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concentric striæ forming complete rings; the polarisation crosses are distinct. We have not found it as yet used as an adulterant for other starches; but if it be so used, its detection will be quite easy from these characteristics.

CONCLUSIONS.

The nut of *Trapa bispinosa*, the water nut of Bengal, is strongly recommended from different quarters as a supplementary staple food. It is occasionally confused with the water

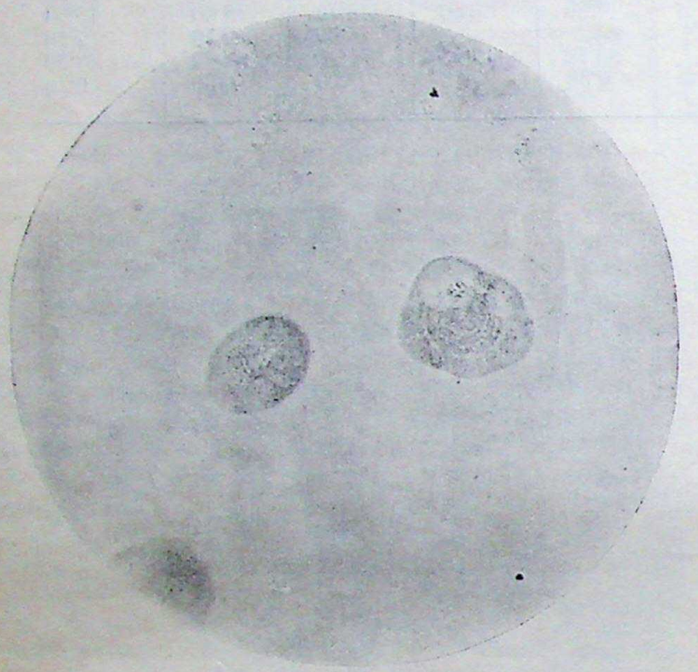

Fig. 4.—The same as Fig. 3, more highly magnified.

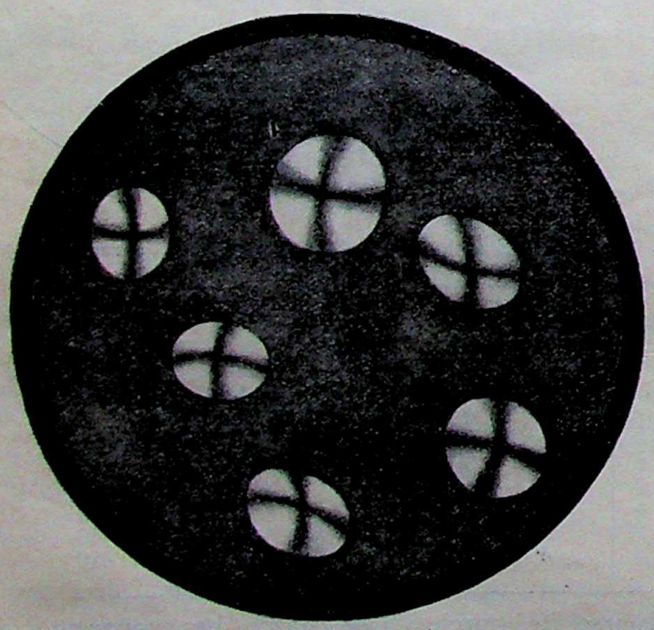

Fig. 5.—Starch grains of *Trapa bispinosa*, by polarised light.

chestnut, which is entirely a different plant with tubers and whose nuts are not edible. It grows in tanks, swamps and pools in and about inhabited localities and is dangerous to public health as it harbours larvæ of malaria-carrying Anopheles; but its economic value is considerable. As a food for invalids, fresh nuts are very suitable, whilst its flour, the *palo*, compares favourably with such light farinaceous foods as arrowroots, sago, rice, etc. In its iron and phosphorus content it may well have the valuable hæmatinic alterative effects attributed to it in the medical literature of ancient India. Incidentally, the discovery of its characteristic starch granules will make detection of its use as an adulterant easy.

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THE CHEMISTRY OF THE BLOOD OF NORMAL HEALTHY INDIANS AND ITS VARIATIONS IN DISEASE.

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THE object of this paper is to present briefly to the practitioner the values of the important chemical blood-determinations in normal healthy adult Indians. The advances made in the field of physiological chemistry have been enormous during the last fifteen years or so. The importance of the chemical findings in the blood in the diagnosis and treatment of various diseases is now realized by all practitioners—medical, surgical and gynæcological.

It is often seen that in many of the doubtful cases which the physician has to face, the investigation into the chemistry of the blood of the patient is of more value than what is obtained by physical examination; it throws more light on the diagnosis and treatment of the disease than is afforded by the stethoscope and the eye. In other cases, it helps in the corroboration of the diagnosis made by clinical examinations.

This paper is based on the analysis of the blood of about sixty healthy adult Indians, covering over a period of two to three years. Owing to want of space, the individual figures for each of the different constituents of the blood have not been detailed in the paper, nor have the methods of determination been described. The average value and the maximum and minimum values obtained for each of the constituents have been given. Controls were, of course, done in each of the methods.

The significance of the different constituents of blood, when present in pathological amounts, has also been noted. It should be stated here that it is often difficult to draw any arbitrary line as to where the normal findings end and the

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pathological findings begin. It is with this view that the maximum and the minimum figures obtained for each of the constituents have been given. It must be emphasized that the blood in all these cases was taken in the morning before breakfast after the whole night's fast (about 15 hours). This fact must be borne in mind, as food plays an important part in the quantitative relations of all these constituents.

I. The Normal Value (for Indians) of the various Chemical Constituents of Blood.

	Maximum Value.	Minimum Value.	Average Value.
(1) Non-protein nitrogen ..	35.6 mgms. per 100 c.c.	18.0 mgms. per 100 c.c.	25.6 mgms. per 100 c.c.
(2) Urea Nitrogen	18.0 mgms. per 100 c.c.	9.0 mgms. per 100 c.c.	12.08 mgms. per 100 c.c.
(3) Uric Acid	3.56 mgms. per 100 c.c.	1.98 mgms. per 100 c.c.	2.02 mgms. per 100 c.c.
(4) Cholesterol	150 mgms. per 100 c.c.	90.6 mgms. per 100 c.c.	119.3 mgms. per 100 c.c.
(5) Calcium	10.2 mgms. per 100 c.c.	8.9 mgms. per 100 c.c.	9.6 mgms. per 100 c.c.
(6) Chlorides (plasma) ..	670 mgms. per 100 c.c.	518 mgms. per 100 c.c.	593.5 mgms. per 100 c.c.
(7) Blood-sugar	120 mgms. per 100 c.c.	80 mgms. per 100 c.c.	100 mgms. per 100 c.c.

II. The Significance of the various Chemical Constituents of the Blood when present in pathological amounts.

I shall next consider the significance and practical importance of these chemical blood-findings in disease. These are specially helpful in nephritis, and in such constitutional disorders as diabetes and gout. These chemical blood-findings have also thrown much light on the diagnosis and prognosis of conditions like eclampsia, pernicious anæmia, disorders of the ductless glands, etc.

I. Non-protein nitrogen.—This mainly represents 85 per cent. urea, 1·5 per cent. uric acid, 5 per cent. creatinine, 4 per cent. ammonia nitrogen, and 4·5 per cent. undetermined nitrogen. Normally, the non-protein nitrogen in blood constitutes about 1 per cent. of the total nitrogen.

Non protein-nitrogen in the blood is remarkably *increased* in interstitial nephritis, parenchymatous nephritis, pneumonia (during crisis), eclampsia, hyperemesis gravidarum, and in uræmia. It is also found to be increased in acute intestinal obstruction. It may be somewhat *decreased* in normal pregnancy (earlier months).

II. Urea.—The main part of urea in the blood is derived from the liver, where it is formed from the ammonia set free from the amino-acids in the process of digestion. It has been proved that the kidneys do not take any part in the formation of urea.

Retention of urea may occur in various conditions. *Marked increase* in urea is found in the terminal stages of chronic interstitial nephritis, in some cases of acute nephritis, in uræmia, and in bichloride of mercury poisoning. In gastric and duodenal ulcer, there is only a *slight* urea retention. In parenchymatous nephritis, the blood-urea findings are comparatively *low*. In normal pregnancy, the urea is often *subnormal*. It is an interesting fact that in eclampsia, though the non-protein nitrogen and uric acid are *increased*, the urea N. is often quite *normal*. It is apparent, therefore, that in eclampsia there is very little evidence of impaired kidney function.

Estimation of blood-urea is of much value in determining whether the kidneys are functioning well or not. Without entering into a discussion of the various elaborate methods for determinations of kidney functions, it may be laid down that for all practical purposes, the simplest method of roughly determining whether the kidneys are doing their work or not is to estimate the urea-content of the urine and do a blood-urea estimation. If the first specimen of urine after dinner (2 hours or more) contains about 2 per cent. of urea, and if the blood-urea is normal or at least below 20 mgm. per 100 c.c., the kidneys may be regarded as quite efficient.

III. Uric Acid.—The relationship of uric acid to gout was established about seventy-five years ago, when Garrod showed that there was definite increase of uric acid in the blood of patients suffering from this disease, but that there was no such increase in rheumatism, thus establishing an important point in the differential diagnosis of these two conditions. The test used for this purpose was very simple although crude—the famous thread-test being used.

The uric acid in the blood is *high*, as has already been said, in gout. It is also high in

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interstitial nephritis. It has been suggested that in the absence of gout, a high value in blood-uric-acid may be regarded as a valuable early diagnosis of nephritis, because it gives an earlier evidence of renal impairment before one finds an increase in either urea or creatinine in the blood.

Uric acid in the blood is also found to be high in acute nephritis, chronic diffuse nephritis, eclampsia, hyperemesis, pneumonia (during crisis), lymphatic leukæmia, etc. It shows very high figures in uræmia. In parenchymatous nephritis, it is usually normal or slightly raised.

The practical value of determination of the uric acid in the blood, therefore, lies in the fact that gout is almost invariably associated with an increased uric-acid-content in blood.

IV. Chlorides.—The estimation of chlorides in the blood is not a common clinical procedure, at least in comparison with the other constituents of the blood.

The chlorides in the blood can be estimated either in the serum or in the plasma, the latter giving higher figures than the former. The figures represented in this paper denote the plasma chloride.

The main importance of determination of chlorides in the plasma lies in the fact that in nephritis, the chloride content goes up very high, giving an indication as to the extent to which the chlorides should be restricted in the diet.

It has been asserted that retention of chlorides in the blood is the cause of high blood-pressure, whether due to arterial changes or as the effect of kidney disease. In 1920, Allen published a paper on this subject and showed that a restriction of salt affords a simple means of treatment of this condition. Mosenthal and O'Hara, however, do not support this theory. O'Hara finds that the blood-chlorides do not always increase with the rise of the blood-pressure and a normal blood-chloride content is quite compatible with hypertension, and *vice versa*.

An increase in blood-chlorides is quite a common finding in eclampsia. In prostatic obstruction, there is a moderate retention.

In general, one expects to find a high chloride value in the blood in nephritis, cardiac conditions, eclampsia, prostatic obstruction, and in some cases of malignancy.

The cases where a *low* blood-chloride is encountered are pneumonia, diabetes, cholera, etc.

V. Cholesterol.—Cholesterol is a lipoid present in the animal body, the chief sources of which are the various animal foods. Some are of opinion that cholesterol may also be derived from the plant-kingdom. Eggs, butter and meat are the main sources from which the greater part of the blood-cholesterol is derived.

Cholesterol is a simple monoatomic unsaturated secondary alcohol. It is closely associated with fat and lecithin and it may combine with fatty acids to form fat. It occurs in the blood, both in free and combined form.

Cholesterol is markedly increased in obstructive jaundice, cholelithiasis, in severe cases of diabetes with acidosis, etc. It is also increased in nephritis, nephrosis, arterio-sclerosis, in certain skin diseases, and in pregnancy (from 4 months till full term, increasing progressively) It is found to be low, sometimes to a marked degree, in pernicious anæmia. The cholesterol is also lowered, if the diet taken is poor in lipoids.

Cholesterol possesses a certain anti-hæmolytic action and the therapeutic administration of cholesterol in cases of pernicious anæmia (in which condition, as has already been mentioned, there is a marked hypocholesterolœmia) has been tried by Italian observers with beneficial results.

VI. Calcium.—The calcium content of blood serum in the normal healthy individual keeps at a very constant level, the variation between maximum and minimum normal values being only about 1·5 mgs. per cent. The pathological significance of an abnormal calcium content of blood has not been very well worked out, but it has been found to become very low in cases of infantile tetany. It has also been found to be decreased in some cases of kala-azar, and in the last stages of nephritis.

VII. Sugar.—The fact that sugar is a constituent of the blood has been known for some time, but it was not until 1913 that Lewis and Benedict introduced a suitable method for its determination. Since then there have been many modifications in the method introduced by workers all over the world.

Primarily, the blood-sugar is increased in cases of diabetes mellitus. Among the various other conditions in which one may encounter slight or moderate increase in the blood-sugar are nephritis, hyper-thyroidism, and hyper-pituitarism. Hyperglycæmia is also encountered in cases of disease of the pancreas, in severe infections; eclampsia, hyperemesis, infantile cirrhosis of the liver, and cholelithiasis.

In cases of hypo-endocrine functions, low blood-sugar findings are usually encountered. These are myxœdema, Addison's disease, pituitary disease, etc. In renal glycosuria, the blood-sugar may be normal or low.

In cases of leucoderma, the blood-sugar findings have been found to be low, sometimes to a marked degree.

There is a definite relationship between the sugar in the blood and the sugar in the urine up to a certain level. If a normal person consumes sugar, his blood-sugar rises, but it seldom goes beyond 0·16 per cent., no sugar appearing in the urine. But if in a mild case of diabetes (which may have a normal blood-sugar) the patient consumes sugar, his blood-sugar rises, and when the blood-sugar level goes beyond 0·17 per cent., the individual passes sugar in the urine. The normal threshold for sugar-excretion has been fixed at this point.

Once the threshold is passed, there is no relationship between the amount of sugar in the blood and the amount of sugar in the urine.

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The threshold level of the kidneys for excretion of sugar, which normally is 0·17 per cent., is not a constant level. It increases in chronic diabetes, nephritis, etc. It is decreased in cases of renal glycosuria, when the threshold level may go down even below 0·08 per cent.

A REPORT ON THREE CASES OF BACILLARY DYSENTERY TREATED WITH BACTERIOPHAGE.

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and

W. BIRD,

MAJOR, R.A.M.C.

(*Central Research Institute, Kasauli*).

THE three cases to be described afford results of unequal scientific value. The first case is that of a British soldier, whose medical history sheet gives no record of a previous attack of dysentery. He had undergone a course of quinine at the Malaria Treatment Centre, Kasauli, and had been free from malaria for eight weeks, when his attack of dysentery occurred. Throughout his period of illness (dysentery) he was under observation in hospital and received no treatment apart from the administration of bacteriophage, rest in bed, and a regulated diet. The second case, an Indian female, under the care of a local practitioner, gave no history of previous attacks of dysentery. Before bacteriophage was administered she had already received several doses of sodium sulphate and had been confined to bed on a milk diet. She was kept under observation by her physician, but the records of the case are not complete, and bacteriological examination of the stools was not systematically carried out. The third case was an Indian male undergoing anti-rabic treatment at the Pasteur Institute, Kasauli, who stated that he had never had dysentery. He was treated with bacteriophage, rest in bed and liquid diet, no purgatives or other drugs being administered. The records in this case also are incomplete.

Case No. 1.—Private R., Yorks. & Lancs Regiment, age 24. Admitted to the British Military Hospital, Kasauli, on December 27th, 1926.

History of Illness.—The patient felt "out of sorts" on December 24th, and at 2 a.m. on the 25th commenced to have diarrhœa with acute pain in the abdomen. He visited the latrine about once every half-hour during that day and night, the intense abdominal pain and frequent liquid motions accompanied by tenesmus preventing him from obtaining any sleep. He did not observe whether the motions contained blood or mucus. Throughout the 26th he continued to pass small and frequent motions without abatement of pain or tenesmus. On the 27th morning he reported sick and was admitted to hospital. Temperature 100.8; pulse 44; blood smear showed no malaria parasites; spleen not enlarged. From 9 a.m. on the 27th to 9 a.m. on the 28th he passed 43 motions containing almost pure blood and mucus, the motions being accompanied by intense pain and tenesmus. He had eaten nothing on the 26th and 27th, and no treatment had been given.

On the 28th (10-30 a.m.) 2 c.c. of dysentery bacteriophage were given by mouth, and 8 motions, containing blood and mucus were passed from that time until 5-55 p.m. At 6 p.m. the dose of bacteriophage was repeated and 7 motions were passed during the night up to 9 a.m. on the 29th. The motion passed at 7-45 p.m. (28th) contained only a few flecks of blood and mucus, and in the motion passed at 9 a.m. (29th) no blood could be observed, although mucus was still present.

On the 29th the patient said he felt much more comfortable, and was put on liquid diet. At 10-30 a.m. he was given another dose of bacteriophage, 2 c.c. by the mouth, and until 9 a.m. next morning 8 motions were passed, semi-formed, and containing fæcal matter and mucus but no blood. The bacteriophage treatment was then discontinued, three doses of 2 c.c. each having been administered.

On the 30th he passed 8 semi-solid stools without blood or mucus and for the first time was free from abdominal pain and tenesmus. On the 31st. 7 semi-solid motions of normal appearance were passed in comfort; on January 1st, 5; on the 2nd, 2; and on the 3rd, 1. On the 1st he was given additional diet, bread, eggs, cream and custard.

On the 4th he passed no motion, and said that he felt quite normal. He was up and about the ward on the 3rd; was placed on full diet and was fit for discharge from hospital on the 7th. His weight on December 23rd, four days before admission, was 11 st. 7½ lb.; January 3rd, 10 st. 7½ lbs.; and on January 23rd, 11 st. 2 lb.

BACTERIOLOGICAL EXAMINATION.

Stool (1). 28th December, 1926.

The stool contained almost pure blood and mucus; no fæcal matter; reaction alkaline to litmus paper; no *E. histolytica* found. A portion of mucus was washed in two changes of peptone water and plated on Conradi-Drigalski medium. After 24 hours incubation at 37°C, a pure culture was obtained in discrete colonies, all the colonies being non-lactose fermenters and apparently identical. A rapid slide agglutination test on 6 colonies was carried out with high titre Shiga, Flexner and Y sera diluted 1 in 20. Immediate agglutination was obtained with Y serum, no agglutination with Shiga and delayed agglutination with Flexner serum.

The 6 colonies were planted on peptone water and sugar media, with the following result after 48 hours incubation:—

Glucose, Galactose and Mannite—acid; no gas.

Maltose—very slight acid; no gas.

Lactose, Raffinose, Arabinose, Saccharose, Dextrin and Litmus Milk—no change.

Indol +.

One colony was tested against high titre agglutination sera: Flexner serum agglutinated up to 1 in 40 dilution. Y serum agglutinated up to 1 in 2,000 dilution:

Stool (2). 29th December, 1926.

Reaction alkaline to litmus paper. Mucus present but no blood. A portion of mucus was washed and plated out as before. After 24 hours incubation the plate presented an entirely different appearance from that of stool (1). Instead of a pure culture of dysentery bacilli, four different kinds of colonies could be seen.

(*a*) Opaque lactose fermenters.

(*b*) Small translucent non-lactose fermenters.

(*c*) Colonies resembling (*b*), but larger and with a more granular surface.

(*d*) Tiny streptococcus colonies.

The proportions of the colonies in 104 examined were:—

(*a*) 50; (*b*) 5; (*c*) 48; (*d*) 11.

(*a*) Colonies were not further examined.

(*b*) The 5 colonies proved to be dysentery bacillus Y.

(*c*) Six colonies gave the following sugar reactions:—

Glucose, Galactose and Mannite—acid; no gas.

Maltose and Dextrin—slight acid; no gas.

Lactose, Raffinose, Arabinose, Saccharose and Litmus Milk—no change.

Indol +.

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They were not agglutinated by high titre Shiga, Flexner or Y sera.

Stool (3). 30th December, 1926.

Contained mucus but no blood. A portion of mucus was washed and plated as before. After 24 hours incubation four different kinds of colonies were observed, similar in appearance to those of stool (2), but in these proportions, (*a*) = 42, (*b*) = 3, (*c*) = 112, (*d*) = 82.

Three colonies (*b*) proved to be dysentery bacillus Y.

Three colonies (*c*) gave the following sugar reactions:—

Glucose, Galactose and Mannite—acid; no gas.

Maltose—slight acid; no gas.

Dextrin and Litmus Milk—acid.

Lactose, Raffinose, Arabinose and Saccharose—no change.

Indol +.

None of them were agglutinated by the dysentery sera.

Stool (4). 1st January, 1927.

Semi-solid; no mucus or blood. A portion of the stool was planted out. After 24 hours incubation, no dysentery bacilli were to be found. The numbers of the different kinds of colony were, (*a*) = 120, (*b*) none, (*c*) = 36, (*d*) too numerous to count.

Three colonies (*c*) gave the following sugar reactions:—

Glucose, Galactose, Maltose and Mannite—acid and gas.

Dextrin—slight acid and gas.

Litmus Milk—acid and clot.

Lactose, Raffinose, Arabinose and Saccharose—no change.

Indol +.

Bacteriophage.—The bacteriophage used for treatment was obtained from a dysentery stool, from the Campbell Hospital, Calcutta, after dilution with peptone water and filtration through a Chamberland F filter. It was active against several strains of dysentery, Shiga, Flexner, Hiss and Y. The patient's stools (1), (2), (3) and (4) were examined for the presence of bacteriophage, after filtration through a Chamberland F candle. Stool (1) contained no lytic principle. The filtrate from stool (2) caused complete lysis of the Y strain isolated from stool (1) in dilutions up to 1 in 100. The filtrate from stools (3) and (4) caused complete lysis of the same strain in dilutions up to 1 in 100,000.

Case No. 2.—Indian female. Age 24. Gives no history of previous attacks of dysentery.

The present illness began in the evening of December 11th, 1926. That night she passed 8 motions, and on the next day more than 20 motions containing blood and mucus and accompanied by severe tenesmus. On the 12th she received 6 doses of Mag. Sulph. and Sod. Sulph. (1 drachm each per dose), and passed 12 motions during the night. A stool seen on the 13th morning contained blood and mucus, but not in large quantities. During the day she passed 12 motions, blood and mucus appearing in large quantities towards evening. Six doses of Mag. Sulph. and Sod. Sulph. were administered that night, and on the following day (14th) she still had frequent loose motions, containing at first mucus but no blood, and later both blood and mucus, all the motions being accompanied by tenesmus. On the 15th (10 a.m.) 2 c.c. of dysentery bacteriophage were administered by the mouth. There were no motions after that and no abdominal pain. On the 16th morning the dose of bacteriophage was repeated. She passed 2 normal stools that day and made an uneventful recovery.

Bacteriological Examination.

Stool No. (1). 15th December, 1926.

Before administration of bacteriophage, was alkaline to litmus paper, and contained blood and mucus. No *E. histolytica* found. A portion of mucus was washed and plated on Conradi-Drigalski medium. After 24 hours incubation an almost pure culture of dysentery bacillus Y was recovered, a few lactose-fermenting colonies being present.

This Y strain was completely lysed by the bacteriophage used for treatment in dilutions up to 1 in 100,000.

Stool (2). 18th December, 1926.

Normal in appearance. On plating out a portion of this stool, no dysentery bacilli were recovered; the plate contained about 100 lactose-fermenting colonies and between 50 and 100 streptococcus colonies.

From stool (2) bacteriophage was recovered, acting on the patient's Y strain in dilutions up to 1 in 100,000, but without lytic action on the lactose-fermenting organism.

Case No. 3.—Indian male. Age 18. Gives no history of previous attacks of dysentery. On December 16th, 1926, he complained of diarrhœa and fever and passed 8 loose motions with griping pains. On the 17th he passed more than 20 motions containing blood and mucus with abdominal pain and tenesmus. His temperature was 102° F. and he appeared to be toxic. On the 18th he was admitted to hospital. 5 motions were passed before noon and at 2 p.m. he was given 2 c.c. of dysentery bacteriophage by mouth. Until 8 a.m. next morning only two motions were passed; the dose of bacteriophage was then repeated and 2 more motions were passed; one at 11 a.m. and one at 2 p.m. Both of these contained fæcal matter, the first showed small amounts of blood and mucus and the second mucus but no blood. He said he felt better and was free from pain. On the 21st he passed a formed stool without blood or mucus, and was discharged from hospital on the 23rd. No treatment was given on the 16th and 17th. From the 18th to the 23rd he was kept in bed on liquid diet (milk and barley water). No purgatives or other drugs were administered.

Bacteriological Examination.

Two stools were examined in this case, one on December 18th before administration of bacteriophage, and one on December 21st. The first stool contained blood and mucus and yielded an almost pure culture of dysentery bacillus Y. The second stool was semi-formed and contained neither blood nor mucus. Dysentery bacilli were not recovered but the filtrate from this stool contained bacteriophage causing complete lysis of the patient's Y strain in dilutions up to 1 in 1,000,000.

Comments.—It is difficult to estimate whether or not bacteriophage treatment contributed to the rapid recovery of these three patients. We think that it did.

Although dysentery due to the Flexner-Y group of bacilli is a mild disease when compared with Shiga infections, none of the cases described in this report had a mild attack. On the contrary they could well be classified as a severe form of the "sub-acute type" (Cunningham, *Ind. Med. Gaz.*, 1923, 58, p. 358).

In the first case there was no evidence that dysenteric symptoms were abating between the onset (December 25th) and December 28th when the first dose of bacteriophage was administered. Twenty-four hours afterwards blood had disappeared from the stools and in another 24 hours the motions were semi-solid, greatly reduced in number and without blood or mucus, and the patient was free from abdominal pain and tenesmus. Neither blood nor mucus reappeared in the motions up to the time of his discharge from hospital.

In the second case the administration of Mag. Sulph. and Sod. Sulph. had a temporary effect in clearing the bowel of mucus, but when this treatment was discontinued for one day, mucus and blood reappeared in large amounts. After the first dose of bacteriophage there was a rapid disappearance of blood and mucus from the stools. In the next 24 hours no motion was

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passed, and 24 hours after, the motions, two in number, were normal.

In the third case a similarly rapid improvement was noted. Sometime between 24 and 72 hours after the first dose of bacteriophage the stools became normal in appearance and number. He was discharged from hospital 6 days after the onset of the disease.

It is known that in Indians, symptoms of dysentery of the Flexner-Y type tend to disappear without treatment, but whether this is equally true for primary attacks as for "relapses" is not clearly established. In the jail population investigated by Cunningham (*Ind. Jour. Med. Res.*, 1917, 5, p. 330) the average number of days required for the elimination of mucus from the stools of patients treated in various ways and untreated was 10·28. The shortest average time was 7·96 days (patients treated with salts) and the longest 12·41 (patients treated by dieting only).

In our cases the elimination of mucus was accomplished in a much shorter time, and there has been no recurrence during the period of observation (in cases Nos. 1 and 2 the observation period was 2½ months). Coincident with the disappearance of dysentery bacilli and improvement in the clinical condition of the patients there was a corresponding change in the nature of the fæcal flora, lactose fermenters and streptococci appearing in increasing numbers.

The rapidity with which the dysentery bacilli disappeared is shown in the table below:—

DATE.	PERCENTAGE OF DYSENTERY BACILLI FOUND ON CONRADI PLATE.
Case No. 1.	
December 28th ..	100 (Bacteriophage administered).
„ 29th ..	4.5
„ 30th ..	0.6
„ 31st ..	No stool examined.
January 1st ..	0
Case No. 2.	
December 15th ..	90–100 (Bacteriophage administered).
„ 16th	
„ 17th ..	No stool examined.
„ 18th ..	0
Case No. 3.	
December 18th ..	90–100 (Bacteriophage administered).
„ 19th	
„ 20th ..	No stool examined.
„ 21st ..	0

On this evidence we are justified in assuming that bacteriophage was a potent factor in cutting short the disease in these cases, and suggest that its value as a therapeutic agent in dysentery be more extensively studied.

We have to thank Dr. Nand Lal, I.M.D., and Lieutenant-Colonel J. Cunningham, I.M.S., for permission to publish the notes on Cases 2 and 3 respectively.

THE SANOCRYSIN TREATMENT OF TUBERCULOSIS WITH SPECIAL REFERENCE TO INDIAN PATIENTS.

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SANOCRYSIN was first introduced in the treatment of tuberculosis two years ago by Professor H. Möllgaard of Copenhagen. Although this remedy was not claimed by him or his early co-workers to be capable of affording a rapid and complete cure of tuberculosis, yet it was thought capable of giving good results within certain limitations. The trials carried out since by some of the best known tuberculosis specialists in many countries are now justifying Möllgaard's opinion.

Since the introduction of sanocrysin, views of its action, dosage and results to be obtained have been much modified; these must be understood before its value in the treatment of tuberculosis can be determined.

The action of Sanocrysin as described by Möllgaard.—After a very careful research on animals Möllgaard(1) showed that his gold compound had no action on the non-tuberculous organism in therapeutic doses, but a most striking effect on those suffering from tuberculosis. The effect varied with the ability of the body to cope with the toxins liberated by the destruction of the tubercle bacilli, for which sanocrysin had a special affinity.

If the immunity was not sufficient, the result was a severe intoxication, clinically manifested by albuminuria, toxic myocarditis, œdema of the lungs, and a sudden fall of temperature. This Möllgaard called "tuberculin-shock" thinking it identical with that observed after strong tuberculin reactions. That the shock is really due to liberation of toxic substances from the tuberculous foci has recently been strongly supported by animal experiment by Madsen and Mörch(2).

If the immunity was sufficient or was made sufficient by a special serum containing a known amount of antibodies, the reaction produced by sanocrysin was manifested by a rise, and not a fall of temperature. During the course of treatment, this temperature reaction as well as other reactions became smaller and smaller, until it finally disappeared when the disease was cured or reduced to a minimum, the organism then behaving like a non-tuberculous one.

Möllgaard believes that sanocrysin acts as a specific remedy in a purely chemo-therapeutic way, with a specific affinity for and power to destroy tubercle bacilli in the body, thereby sterilizing it and curing it of the infection, the tuberculous lesions undergoing in a very short time the same changes as found in spontaneous healing.

Observations indicating the action of Sanocrysin as being due chiefly to absorption of tissue products.—Considering the action of sanocrysin to be chemo-therapeutic, Möllgaard and

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his early co-workers aimed at the production of the most intensive action upon the tuberculous foci, with due regard to the patient's power of resistance against the toxins liberated. Large doses with small intervals between them were given, the whole course lasting about a fortnight. This however, in the opinion of most observers, has proved too trying and even dangerous.

Much smaller doses with larger intervals were introduced, yet with apparently equally good results, although the reactions produced were often either very small or none at all. The argument that if there were no reactions the sanocrysin had no effect could not be maintained against the clinically good results, even in cases where all other methods of treatment had failed. This suggested a modification of Möllgaard's view of the action of sanocrysin.

It was found early in the treatment that those cases of pulmonary tuberculosis which showed the best results were those with fresh exudative foci, while older fibroid cases were much less influenced. X-ray-plates showed that the blurred, undefined shadows, indicating the exudative process round cavities and older fibroid foci, cleared up with astonishing rapidity, leaving the fibroid lesions with sharp, well-defined borders. The fibroid foci being poorly supplied with blood are not exposed to the action of sanocrysin in the same way as the richly vascularized tissue of the exudative processes and are therefore not influenced as they are.

These observations, seen by most observers, have led Begtrup-Hansen(3) to suggest that the good effect of sanocrysin is due to the decomposition and dissolution of the exudative tissue. This brings into circulation protein-containing products of the tissue broken down, stimulating the different defensive forces of the body and thereby probably producing an increased phagocytosis and formation of anti-tuberculous products, resulting in an increased fibrotic growth round the foci.

This explanation seems to me to fall into line with Calmette's(4) conclusions as to the creation of tuberculous immunity in the body, and to give a better explanation of the action of sanocrysin than that of a purely chemo-therapeutic one with destruction of the tubercle bacilli, producing a sterilization of the body.

While clinically the observers were forced to use smaller doses spread over several months on account of the dangers of the large doses, scientifically the smaller doses seem now to be more reasonable also, because the building-up of the defensive forces of the body cannot possibly be accomplished in two or three weeks in a disease like tuberculosis, but it is a long and gradual process.

Recently some very important research work on not less than 236 animals has been carried out by Madsen and Mörch(2), and has proved the possibility of sterilizing tuberculous animals, and has thrown light over the mode of action of sanocrysin.

These observers have shown that in animals the result of sanocrysin treatment depends on the qualities of the infecting strain of tubercle bacilli and on the kind of tuberculosis it produces in the organism. They found that in animals inoculated with a highly virulent culture, the dose of sanocrysin should not be less than 2 centigrammes per kilo to produce a real cure: 48 control rabbits all died of tuberculosis in 17 to 60 days, while out of 64 animals infected in the same way as the controls and treated with this dose and with the treatment begun 4 to 12 days after the infection, 57 rabbits or 89 per cent., showed no signs of tuberculosis when killed three months after infection; 52 out of these were found sterile both on inoculation of Petroff's medium and by injections into guinea-pigs. By smaller doses not nearly as good results were obtained(5).

A very important observation by these workers is that sanocrysin injected simultaneously with the inoculation of the bacilli has no effect. Ten animals were treated simultaneously with the infecting inoculation and with 2 centigrammes of sanocrysin per kilo. They all died in from 16 to 60 days and showed on post-mortem exactly the same kind of tuberculous infection as the control animals.

Working with a medium-virulent culture, Madsen and Mörch found that with treatment, when begun two or three weeks after the infection, very good results were obtained even with small doses of sanocrysin (from 0·5 centigrammes per kilo) increased gradually with intervals. They found further that when animals were infected with this medium-virulent culture, the tuberculosis was located chiefly in the lungs, while after infection with highly virulent culture the disease was found spread throughout the whole organism.

From these experiments conclusions are drawn which strongly support the clinical experience with sanocrysin in human tuberculosis. The experiments show that the bacilli must be fixed in the tissue before the action of sanocrysin can take place. This is an interesting fact when compared with the experience that sanocrysin has very little bactericidal action on the tubercle bacilli *in vitro*. The action of sanocrysin in the human organism is apparently on the tuberculous lesions, and the curative effect is found in the liberation from these of anti-tuberculous products.

It is interesting to see that studies on experimental tuberculosis also support the therapeutic value of the small doses now used in pulmonary tuberculosis in human beings. In recent publications Möllgaard(6) recognises, on the strength of the experiments of Madsen and Mörch, that sanocrysin has its best effect (with high-virulent infection at least) when a combination has taken place in the organism between the bacilli and the tissue.

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From clinical experiences, as well as from experimental tuberculosis, we conclude now that the curative effect of sanocrysin is produced, not by destruction of the bacilli in the organism, but by action on the tuberculous tissue for which it has a special affinity.

Metallic action.—It is now generally recognised that sanocrysin has a metallic action and has it to such an extent that this has been one of the factors modifying the whole treatment.

When small doses are given some of the good results may perhaps be due even to this action. Walbum's researches(7) in treatment of infections with heavy metals in weak concentrations should be borne in mind in this connection.

Action on non-tuberculous Patients.—Although sanocrysin apparently has no action on normal non-tuberculous bodies, several instances were reported last year in which reactions were experienced on patients suffering from diseases other than tuberculosis, amongst them being cancer. Of special interest is one case examined post-mortem by Hansborg(8); the diagnosis was cancer of the left lung and no signs at all of tuberculosis were found. Death occurred 8½ months after the last injection of sanocrysin, and gold was still found in the body, especially accumulated in the tumour, where 8·7 per cent. of the gold injected was found.

The Circulation and Excretion of Sanocrysin.—While Möllgaard thought that most of the gold was excreted through the kidneys within 4 to 6 days, recent research has shown that much is also excreted through the intestines, even 14 to 25 per cent., according to Hansborg, and a considerable amount remains stored up in the body for a long time. The gold is especially stored up in the liver and the muscles, as shown by Hansborg(8) but not in the lungs, contrary to what was previously declared by Frandsen(9). Even after one single injection not more than one-third of the gold had been excreted after 1½ months, and in another case Hansborg found gold in the urine and stools 8½ months after the last injection.

From these researches and others by Lomholt(10), it is now believed that sanocrysin behaves in the body in the same way as other heavy metals, especially mercury. This is further borne out by several cases showing reactions following injections of sanocrysin which are clinically those of metallic poisoning.

The Dosage.—Based on Möllgaard's view of the chemo-therapeutic action of sanocrysin, at first doses of from 0·5 to 1·5 grammes were given intravenously at intervals of from one day to a week, usually every third day. The course was considered completed after 5 to 6 injections.

After these doses very severe reactions were usually observed, such as high rise of temperature, albuminuria with casts, exanthemata, pain in the joints and muscles, vomiting, diarrhœa, hiccough, anorexia, and great loss of weight. Also considerable focal reactions with increased expectoration and more râles in the affected parts with pain in the chest were common. The focal reactions were often not merely temporary, but continued and led to activation of the disease.

In not a few cases "tuberculin shock" was seen, in some causing the death of the patient.

The severe toxæmia, of which all these reactions were manifestations, could not in all cases be relieved or prevented by the special antitoxic serum. This often only made things worse by producing serum-sickness in addition to the existing depressed condition of the patient.

Although in many other cases promising results were obtained, with disappearance of the symptoms of the disease, these frequent cases of severe shock and set-back called for a modification of the treatment if possible.

The first modification was that high fever was considered to contra-indicate treatment with sanocrysin.

The second was that no further dose was to be given to patients still suffering from fever, albuminuria, or other reactions from the previous dose.

This naturally increased the intervals between doses. Another reason for waiting, especially for the disappearance of all traces of albuminuria, was the danger of metallic poisoning observed in some cases in the later stage of the treatment.

Further, the antitoxic serum was soon dispensed with by nearly all observers, except in cases of threatening shock and strong albumin reaction very early in the course of treatment. With the present method of treatment threatening shock however is very rarely seen. Secher(11) one of Möllgaard's early co-workers, in his last publication still defends the use of large doses in conjunction with serum.

The present dosage, as generally used, is from 0·10 to 0·25 grammes, increasing up to 1 gramme, with intervals of from 4 to 7 days or more between the injections. A course is considered completed with 10 to 12 doses. If a second course is given this is usually done only after an interval of two months.

Selection of Cases.—The due selection of cases is of great importance. Sanocrysin should not be given to any patient showing any kind of kidney affection or intestinal or abdominal tuberculosis. Further, it should not be given to any advanced cases showing signs of toxemic cachexia.

The best results are obtained in early exudative cases not more than six months old, but good results are also often seen in older fibroid cases, especially when accompanied by fresh exudative processes.

With the above mentioned modifications of dosage and due selection of cases, the formerly very dangerous treatment has now become comparatively safe in skilled hands with a sufficiently careful supervision of the cases, which should be treated only in well-staffed hospitals.

Results of treatment.—The usual results observed are a general clearing up of all clinical

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symptoms of activity in favourable cases, more rapidly than is experienced in other kinds of treatment. This improvement is often seen in advanced cases which have failed to respond to those other kinds of treatment, and where artificial pneumothorax treatment cannot be given.

A study of statistical reports from many sources shows that of patients suffering from pulmonary tuberculosis treated with sanocrysin, 50 to 60 per cent. have improved. Sanocrysin is however of very little value in cases of surgical and laryngeal tuberculosis and lupus.

A very interesting comparison is given by Würtzen(12) between cases treated with sanocrysin and a number of control cases, apparently equally advanced and whom he had offered to treat with sanocrysin but who, for personal reasons, did not agree to undergo the treatment. Of 61 cases treated with sanocrysin 49, or 82 per cent. improved and 19 lost tubercle bacilli in their sputum, while of the 48 control cases 16, or 33 per cent. improved and one case only lost bacilli.

Begtrup-Hansen(3) comparing the results of 153 patients with pulmonary tuberculosis treated by him with sanocrysin with all other cases treated by all other methods in his sanatorium, concludes that the best results are seen in those treated with sanocrysin, with the exception of patients treated with artificial pneumothorax. He believes also that this last treatment gives more lasting results than sanocrysin, although little is yet known about this.

Treatment of Indian Patients with Sanocrysin.—For about two years sanocrysin has been used in the Union Mission Tuberculosis Sanatorium at Arogyavaram near Madanapalle(13), (14). Up to April 1927, we have treated 90 such Indian patients. Ten cases are still under treatment, leaving 80 cases to be considered. Of these 4 were very early cases, 25 moderately advanced cases, and 51 very advanced cases.

None of the cases had high fever when sanocrysin was given. None of them had any affection of their kidneys before the treatment, except one case in which albumen had been found some months earlier. This case is to be specially mentioned as on the ninth day after the only dose of sanocrysin, 0·10 gramme, the patient suddenly developed strong albuminuria with vomiting, diarrhœa, scanty urine, and great weakness, but no fall of temperature. As no albumen was found in the urine three hours after, no serum was given. All the symptoms mentioned disappeared after a few hours and albumen never appeared again, although casts were found several days after. This case shows how careful one must be not to give the doses at too short intervals as this patient would probably have developed still more threatening symptoms had she received another dose a few days after the first one. It was the previous albuminuria (months earlier) which was the reason why in this case we did not intend to give another dose until after two weeks interval. After this severe reaction on the ninth day no more sanocrysin was given.

While in the beginning we gave sanocrysin at intervals of about five days, we have during the last half year given it at intervals of a week, taking into consideration the mode of excretion of the gold. We have found that with longer intervals we have been able to increase the amount of sanocrysin without seeing more affection of the kidneys or other symptoms of severe reaction. The average total amount of sanocrysin given in each course of treatment is now about 3 grammes, the highest amount in any case having been 4·6 grammes. The dose now used by us is 0·10 to 0·12 grammes as the initial dose. When there are no reactions this is followed by doses of 0·25, 0·37, 0·50, 0·62, 0·75 and 1 gramme, although the last dose is only reached in a few cases: 7 to 12 injections constitute a course. No second course is given until after an interval of at least two months.

Febrile-reaction, very slight except in a few cases, was seen in 54 of the 80 cases; in one case only a severe reaction was seen which lasted for more than a few days.

Albumin-reaction was seen in 55 out of the 80 cases. We have observed that the stronger albumin reactions are usually found 5 to 7 days after the injection, and for this reason we consider it dangerous to use shorter intervals than one week in Indian patients. That a single injection of sanocrysin can produce a severe and prolonged albuminuria has been demonstrated in one of our cases, a several years' old, fibroid case where albumin was found up to three months after the injection.

It is necessary to emphasize the great importance of careful examination of the urine three to four times daily, as we have observed albumin at one time of the day and not at others. If the urine had been examined once a day only, many cases with albumin especially during the last days of the intervals, would have been totally missed, and we would have run the risk of giving the next injection too early. It is necessary also to register the temperature of the patient four to six times during the day of injection and four times on the other days. For these reasons sanocrysin treatment is decidedly a hospital treatment, as rapid detection of severe albuminuria, or a sudden fall or very high rise of temperature makes immediate attention absolutely necessary. It requires a well trained staff to treat several patients with sanocrysin.

In the West *the sedimentation test* (the velocity of the sedimentation of the red corpuscles) is now being used as a control in the treatment with sanocrysin. At first a more rapid sedimentation was observed after injections, and smaller figures were observed later on only after the course of treatment was finished. This was observed in the period when the large doses were given and is an indication that the doses were too large; when the smaller doses are given we see a slower sedimentation. If this is not

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the case, the intervals between the doses should be increased, and the doses should be smaller. Our experience with the sedimentation test in this treatment corroborates this.

Due observation of *other symptoms* is equally necessary. As soon as the patient complains of a bitter or metallic taste or of pain in the inside of the cheek, sanocrysin must be totally stopped. We have seen two severe cases of metallic poisoning. In the first case only after the seventh injection albuminuria appeared. After the eighth injection albumin was found on the second day, but not on the day of injection. On this day however there were seen symptoms of early stomatitis with a metallic taste. The following days ulcers appeared on the inside of both cheeks. The ulcers became worse and took three months to heal. By interrupting the treatment as soon as a bitter taste or even the slightest symptoms of stomatitis appear, we have avoided further cases of severe stomatitis.

In another case symptoms of metallic poisoning developed suddenly without albumin in the urine, but with stomatitis, pain in the joints, and itching of the skin. In a few days a severe dermatitis with general œdema developed, and a few days later albumin appeared in the urine. The patient improved again considerably, but although sanocrysin was stopped the symptoms suddenly became worse, and the patient died, being too weak on account of her severe tuberculosis to withstand the intoxication.

We have observed that itching of the skin with the appearance of a dust-like dermatitis is a symptom which necessitates interruption of the course of sanocrysin. In four such cases a black deposit developed in the skin, in two cases even in the face, which deposit has been very resistant and in one case still remains after one year.

Another symptom which we have found to be a great danger signal is diarrhœa, developing the same or the day following the injection.

Once a severe hiccough was observed, lasting day and night for eight days. This symptom appeared on the fourth day after the third injection without any previous signs of warning. As this hiccough has ended fatally in some cases in the West, we interrupted the course of treatment in this case.

The result of the treatment of 80 patients.—A statistical analysis of our 80 cases gives the following results:—

Fever disappeared in 22 out of 35 cases confined to bed with fever before sanocrysin was given, although some of these cases had been confined to bed for a long time, one of them even for one year, another for one and a half years. Fever has also disappeared in cases in which no other treatment, not even pneumothorax treatment, could make it disappear.

Tubercle bacilli disappeared in 19 out of the 54 cases with bacilli in the sputum when the course of treatment was begun. This figure is less than the figures of the West.

Most of the patients gained in *weight* during the course of treatment, and in many of the cases *the lungs* cleared up very much, the râles either disappearing or becoming drier and fewer in number. This improvement in the lungs always coincided with improvement in the clinical symptoms.

Of the 80 cases, of which as already mentioned 4 were early, 25 moderately advanced, and 51 very advanced, 48 or 60 per cent. improved under the treatment. Out of the 80 cases, not less than 35 or 43 per cent. were "much improved"; 9 cases were not influenced at all, and in 22 cases the course of treatment had to be interrupted as the patients could not tolerate sanocrysin, of which number one died.

If we consider those cases only in which the course was completed, we find that out of 58 cases 66 per cent. were "much improved" and 22 per cent. improved.

If we consider all the cases in stage III, whether the course of treatment was completed or not, and all of which had a bad prognosis, we find that not less than 23 out of 51 were "much improved."

Conclusions.—The question before us is what value sanocrysin has in Indian patients. After the results here mentioned, we do not hesitate to express as our opinion that sanocrysin gives results in Indian patients equal to those obtained in the West, although smaller doses have to be used in India. Pneumothorax treatment has a very limited scope in India, on account of the difficulty of keeping Indian patients a sufficiently long time in hospital under this treatment. As long as this is so, sanocrysin treatment must continue to be of more value in India than in the West.

The result of our observations corroborates the experience of those in the West who find that this new remedy is not by any means capable of curing all cases of tuberculosis, and in unskilled hands is even extremely dangerous to the patients, though it has nevertheless proved to be of great value when properly used.

We, who treat the disease and know how difficult it is to bring about real amelioration in the more advanced stages, are grateful for a new remedy which produces an improvement in about fifty per cent. of these cases. We believe therefore that the outlook in the treatment of tuberculosis, after the introduction of sanocrysin, is brighter and more promising than before, both in the West and in India.

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DISEASE OF THE GALL-BLADDER AND GALL-STONES.

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THE formation of gall-stones is associated with cholecystitis, and no gall-bladder containing stones is free from inflammatory changes in the mucous membrane, even if this has to be proved microscopically. Cholecystitis can exist without gall-stones; in typhoid fever as we know, it can clear up, or go on to the formation of gall-stones. The cause of gall-stones is often obscure, or at the best it is a guess in any one case; this we do know, that the cholesterol content of the blood is a varying quantity, variations occurring during disease, such as in cancer, or normally during menstruation. This latter accounts for the greater frequency of gall-stones in women. Multiple occurrence is another feature of gall-stones, and if a collection of these from one gall-bladder be examined, it is frequently found that they can be divided into groups of 4, 5, 6 or more, and each stone in the group exactly resembles that of its fellows in size and shape, and since groups form a series increasing in size, it is suggestive of formation in groups according to the waves of hypercholesterolæmia.

Given that if no acute cholecystitis is set up by stones, the presence of these may give rise to no symptoms, still it is rare to find a case without the history of *indefinite dyspepsia;* one has not to wait for an attack of the "classical" biliary colic followed by jaundice to diagnose a case as one of gall-stones, though the difficulty is great in coming to a conclusion when signs are so uncertain; even tenderness over the region of the gall-bladder can be due to causes other than stones, or be due to conditions in the neighbouring organs. Biliary colic may be simulated by the crisis of acute pain and vomiting known as Dietl's crisis, which occurs in cases of displaced right kidney.

The exacerbation or subsidence of this indefinite dyspepsia is associated with the condition of the neighbouring organs, the stomach and colon and the degree of their distension; hence any treatment designed to relieve this ameliorates the dyspepsia of gall-bladder origin. Again how difficult it is to disentangle the dyspepsia due to an appendix from one of the above. Jaundice can only occur if a stone escapes into the common duct or has formed there; even if none be present when an operation is undertaken, it is as well to examine the common duct most carefully for a stone, either by manipulation between the fingers or by opening and probing the duct.

The complications of gall-stones as affecting the gall-bladder are:—

(1) chronic cholecystitis,
(2) suppurative cholecystitis or empyema,
(3) acute phlegmonous cholecystitis,
(4) rupture with extravasation of bile, etc., into the peritoneum,
(5) a large mucocele,
(6) cancer.

Chronic cholecystitis is characterised by the indefinite dyspepsia and pain or discomfort referred to above. It may produce so much fibrous change in the walls that eventually a shrunk and shrivelled gall-bladder is found, more or less adherent to neighbouring organs.

Suppurative cholecystitis is a more serious condition, occurring in acute disease such as typhoid, *Bacillus coli* infection, pneumonia, or after previous attacks of cholecystitis. It is diagnosed by the acute pain, tenderness and rigidity in the region of the gall-bladder, and the accompanying fever; it may be possible to feel the enlargement through the abdominal wall. This condition requires immediate surgical interference and drainage. If there are dense adhesions it may not be possible to excise the gall-bladder at the time of the operation for drainage. Acute suppurative cholecystitis can occur without jaundice. It is important to explore and remove any gall-stones when operating to establish drainage.

Acute phlegmonous cholecystitis is a grave complication, and as bile will rapidly extravasate along with infective contents the danger of general peritonitis is imminent; hence operative interference must be resorted to at once. Similarly, a rupture of the gall-bladder by a stone ulcerating its way through the wall will cause peritonitis. These cases if taken fairly early are not hopeless, if the peritoneum can be cleaned and effective drainage established by a number of tubes in various directions. Mucocele is a condition resulting from closure of the cystic duct by chronic inflammation or stone. It is felt as a tumour through the abdominal wall; operation is the only treatment to be advised.

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The general practice in surgery of the gall-bladder is to remove it when diseased; but, as cholecystitis is an invariable accompaniment of gall-stones or *vice versa,* most surgeons make a practice of removing the bladder. A healthy bladder has a pale blue-grey appearance, which is very characteristic: this shades off to white as the result of cholecystitis. Merely to remove gall-stones and sew up or drain is only to invite subsequent trouble; cases of simple stone without demonstrable cholecystitis are too rare to act as a guide, or to invite the retention of the gall-bladder at the time of operation. It is argued that without this reservoir for bile, this last is poured into the intestine at any time and at all times, but it is proved that dilation of the common duct takes place and takes on the function of the missing gall-bladder.

A gall-bladder that has been drained through the abdominal wall becomes adherent and interferes with the mobility of the liver and the sliding action of the abdominal wall over this organ, resulting in dragging pain and invalidism. Adhesions in liver abscess drainage are on the upper surface of the liver, therefore no drag on the stomach or duodenum takes place, as when an adherent gall-bladder is pulling on these organs. Stones become a chronic source of irritation, so it is not surprising to find cancer, especially of the common duct, associated with these.

There is an important complication to be borne in mind when infective and acute or chronic inflammation of the gall-bladder occurs, viz., acute, subacute or chronic pancreatitis, the chronic being the most frequent. The inflammation of the bile ducts spreads by the pancreatic duct to the pancreas, or by means of the lymphatics. It is not surprising that such cases as we are considering become diabetics. We should look out for them in India. Courvoisier's law is "that persistent jaundice with distension of the gall-bladder depends on other causes than gall-stones." It means that persistent jaundice is a sign rather of chronic pancreatitis than of malignant growth. The symptoms of pancreatitis, especially acute, need not be referred to here, though it is as well to know them as they are most alarming and very serious. Loewi's adrenalin mydriasis test is most useful in diagnosing the association of pancreatitis with gall-stone.

The production of intestinal obstruction by a gall-stone ulcerating its way into the duodenum and lodging at the ileo-cæcal valve is a rare condition, and would be difficult to diagnose, though operation would throw light on the mishap.

Cholecystography or *x*-ray pictography of the gall-bladder has lately come to the fore. After the administration of the salt tetrabromphenolphthalein intravenously or by the mouth, it is found to be excreted by the gall-bladder after a certain time, beginning about three hours or less after the administration. As it is opaque to *x*-rays, a shadow of the gall-bladder is shown in the skiagram, its size, shape and position can then be judged with reference to the normal. The iodine salt is now preferred, being more opaque and is called iodeikon, for short. Practice varies in the administration. In Edinburgh 2·5 gramme doses are considered sufficient, given intravenously, diluted in 30 or 40 c.c. of water. The dangers of large doses, 5 to 6 grammes, are nausea, vomiting and collapse. In London numerous students have been experimented on with 3 to 4 gramme doses in a number of keratin capsules (20) or stearin capsules, sufficient of these dissolving to produce results, though some pass undissolved, and are seen by *x*-rays as low as the cæcum. The normal gall-bladder gives a pear-shaped shadow, lying vertically and outside the bodies of the second and third lumbar vertebræ and equal in length to the depth of these vertebræ. The pictures are taken five and fifteen hours after the administration of the iodeikon; the salt is not usually found after twenty-four hours, or only a trace of it may be detected. A barium or bismuth meal can be given just after the first picture is taken, and 15 minutes after a second picture so as to define any abnormality of the stomach or duodenum. In order to ensure a good flow of bile into the gall-bladder preparatory to the 5-hour picture a fatty meal (cream and butter) is given an hour or half-an-hour before this.

Considerable advances have been made in the methods and apparatus of radiography during the last three years, and it is only because of these that cholecystography is possible. I doubt whether apparatus in India is sufficiently up to date to deal with this at the present moment, though time will correct this. I have seen an exhibition of moving radiograms showing the bones of the limbs and chest in motion taken at the rate of 32 to the second; this I quote as an example of the progress recently made.

INTRAVENOUS IODINE IN PNEUMONIA.

By K. C. GHOSE,
Medical Officer, Rupai Tea Co., Doom Dooma P. O., Assam.

IN view of the statements with regard to the value of iodine administered intravenously in plague, pneumonia, and septic conditions, the following figures may be of interest.

All the cases in Table I had a daily intravenous injection of iodine for at least three, and sometimes for four or five days. The injection consisted of iodine, grs. ii, with potassium iodide, grs. iii, in 10 c. c. of normal saline. The injections were given as soon as the diagnosis was made.

Table II gives the control cases, not treated with iodine. Every alternate case of pneumonia admitted to hospital was treated with iodine, there being no selection of cases with regard to their severity or other features of the case.

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TABLE I.

Abstract of 20 Pneumonia cases treated with Iodine.

Number.	Names.	Sex.	Age.	Duration of Fever.	Results.	Remarks.
1	Lachloo	M.	50	10 days	Cured	Suspected phthisis
2	Ramcharan	M.	25	6 days	"	
3	Sreematy	F.	45	4 days	"	
4	Kripaly	M.	32	4 days	"	
5	Sadhoba	M.	35	5 days	"	
6	Kartick	M.	32	12 days		accompanied with pleurisy; effusion
7	Tooda	G.	13	3 days	"	
8	Dukaloo	M.	32	7 days	Died	from phthisis after 2 months
9	Dula	G.	16	6 days	"	
10	Lakhan	B.	17	8 days	Cured	
11	Atla	M.	30	7 days	Died	
12	Taga Lenga	M.	38	4 days	Cured	
13	Prem	M.	38	4 days	"	
14	Damodar	M.	38	3 days	"	
15	Butena	B.	12	7 days	"	
16	Dhani	M.	38	6 days	"	
17	Payaree	G.	14	6 days	"	
18	Chorosia	G.	15	5 days	"	
19	Latel	B.	14	3 days	"	
20	Dhansing	M.	45	4 days	"	

TABLE II.

Abstract of 20 Pneumonia cases not treated with Iodine.

Number.	Names.	Sex.	Age.	Duration of Fever.	Results.
1	Sinkadoo	M.	32	9 days	Cured
2	Samoo	M.	43	9 days	"
3	Bhulia	F.	32	8 days	"
4	Budhua	M.	22	5 days	"
5	Somi	F.	38	10 days	"
6	Ahirman	M.	48	9 days	"
7	Pochi	G.	15	5 days	"
8	Gurubary	F.	25	5 days	"
9	Mendra	M.	38	7 days	Died
10	Sukra Tona	M.	32	7 days	Cured
11	Dhabla	F.	42	15 days	"
12	Kandra	M.	25	18 days	"
13	Giridhari	B.	18	3 days	"
14	Koita	F.	55	8 days	"
15	Sukurmoni	F.	48	8 days	"
16	Bilai	F.	30	5 days	"
17	Basoo	B.	14	4 days	"
18	Lachman	B.	14	6 days	"
19	Udal Chinaya	M.	35	4 days	Died
20	Ramsing	M.	32	7 days	Cured

As far as one can judge from the series of cases and controls, the injections of iodine do not appear to affect the prognosis with regard to the disease, but I feel sure that the condition of toxæmia was less in the iodine-treated cases. No ill effects were seen as the result of iodine administration. The injections were in all cases given very slowly.

I am indebted to our Principal Medical Officer, Dr. J. Moncrieff Joly, for his kind permission to publish these results.

KALA-AZAR IN THE SIMLA HILLS.*

By P. SAVAGE,

MAJOR, I.M.S.,

Resident Medical Officer, The Lawrence Royal Military School, Sanawar, Simla Hills.

IN the last report of the Kala-azar Commission (see *Indian Medical Research Memoirs—Memoir* No. 4, February 1926) it is stated that kala-azar appears not to occur above a certain altitude, and Shillong, which is situated in the centre of the endemic area, but at a height of 5,000 feet, is believed to be free from the disease.

In 1925 Sinton pointed out that the distribution of kala-azar in India coincides very closely with that of *P. argentipes,* which is now held to be the probable transmitter.

The possibility of other species of *Phlebotomus* transmitting the disease in India, has not, as far as I know, been studied, though such a possibility is strongly presumed. (*Memoir No.* 4, page 11).

The following two primary cases occurring at Sanawar in the Simla Hills, are therefore communicated.

Case 1.—Edgar R., aged 16 years, was admitted to the School hospital on 24th March, 1926, with a temperature of 102° F.

The immediate history of his illness is as follows:

He had recently been ill.

During the long Christmas holidays he went home to his parents in Nahan, Sirmoor State, and was in hospital there with fever and an enlarged spleen from 27th January to 22nd February, during which time the temperature remained above normal for nineteen days.

He then returned to School at Sanawar and resumed work till his admission to hospital.

On admission.—He is a pale, 'septic' looking boy and under weight for his age and height.

On routine examination, the outstanding feature was an enormous enlargement of the spleen, almost down to the umbilicus.

The liver was not enlarged.

There was a distinct area of dark pigmentation on the 'moustache area' of the upper lip.

Progress and Treatment.—A blood smear was taken and examined for malaria parasites.

None were found.

The hæmoglobin index was 80 per cent., the blood pressure was 96 mm.

Two days later (26th) the four hourly chart showed a deeply remittent type of temperature occurring diurnally.

The temperature was swinging between 96° F. and 105° F. and was accompanied by profuse sweating.

This gave a hint as to the probable cause.

* This article is published with the kind consent of the Director of Medical Services in India and the Principal, The Lawrence Royal Military School.

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The quinine which he had been having since admission on the 24th was omitted and an initial dose of Urea-stibamine was injected intravenously.

Meanwhile, blood agar medium (Shortt's) was being prepared and no further injections were given of the Urea-stibamine.

A spleen puncture was done on the 30th March and the agar tubes inoculated.

At the same time smears from the spleen puncture were made and found to contain Leishman Donovan bodies.

(The agar tubes were unfortunately contaminated and and no growth occurred.)

The parasites having been found, vigorous treatment was commenced with Urea-stibamine, and 0.10 grm. of the drug was given intravenously three times a week.

During the third week this was increased to 0.15 grm. thrice weekly.

Improvement was rapid and after the fourth dose the temperature never went above the normal line.

On the 25th April, just over a month after admission, he was discharged from hospital and marked fit for School, but to attend every week-end for further injections of Urea-stibamine.

On discharge it was noted that the spleen was considerably reduced in size, being now recorded as 'plus two fingers.'

The hæmoglobin index had risen to 90 per cent. and his weight was 99 lbs.

Case 2.—Edward I. aged 15 years.

This was an advanced case with a history of ill-health extending over two years and briefly is as follows:

In 1924 he was in the School hospital for pyrexia of unknown origin for 6 weeks.

Widal's test and blood cultures were negative for the enteric group of fevers.

There is no record of the state of the spleen or liver.

A few doses of Urea-stibamine had been given empirically which had brought down the temperature.

A study of the temperature chart of that time shows a double rise on most days.

In 1925 he apparently kept good health but remained a pale anæmic boy.

In January 1926 he was in hospital for acute bronchitis with an irregular temperature.

In March he was in hospital again for influenza.

(A form of influenzal sore throat was at that time epidemic in the School.)

The spleen was then felt to be enlarged.

On the 13th April he complained of loss of appetite and fatigue.

On the 17th April he was admitted to the School hospital with a temperature of 102°F. and a sore throat.

On admission, a routine examination was made and a very enlarged spleen was found, almost down to the umbilicus.

Progress and Treatment.—On the 22nd he complained of severe pain in the left shoulder joint and the right ankle.

On the 24th there was slight effusion in both ankle joints and both shoulder joints.

About this time hæmorrhages were observed, which were distributed as follows:

Petechial hæmorrhages on the abdomen.

A patch of purpura on the outside of the right thigh at its middle.

In the middle of the back.

In the left scapular region.

Some of these patches were almost the size of the hand.

On the 26th the right foot and ankle were œdematous.

The complexion was pale and had a peculiar bluish tinge out of proportion to any cardiac or pulmonary change.

There was commencing distension of the abdomen which slightly masked the splenic enlargement.

On the 23rd the abdominal distension had increased.

On the 29th the distension had diminished, and ascites was suspected.

Joint symptoms had abated but the right ankle was considerably swollen and œdema was present from below the knee.

There were signs of bronchitis in both lungs.

On the 1st May acute broncho-pneumonia developed in the right lung.

The spleen remained considerably enlarged but had decreased by one finger's breadth.

On the 3rd May ascites was definite

The abdominal distension had diminished but the spleen remained very large.

On the 12th May, Napier's aldehyde test was done.

A reaction of cloudiness occurred immediately and within half an hour opalescence and jellification had taken place.

The test was considered positive.

Spleen and liver puncture were not attempted earlier in the disease because of the tendency to hæmorrhages, as shown by the purpura.

Further patches of broncho-pneumonia occurred in both lungs and the case ended fatally on the 16th May.

Three days before death a liver puncture was done and blood agar tubes were inoculated.

These unfortunately became contaminated with pyogenic organisms and no parasites developed.

Malaria, tuberculosis and the enteric group were eliminated early in the illness.

Treatment was given with Urea-stibamine practically throughout the disease, but seemed to have no control on the fever.

Quinine had been given steadily during the first week of the disease, when it was, for obvious reasons omitted.

The first case is clearly a true infection of kala-azar and the second case is not conclusive, except on clinical grounds, as Napier's aldehyde test is often positive in other diseases, but the diagnosis should be acceptable.

That infection had occurred in Sanawar appears to me undoubted and a brief history of the movements of these boys follows.

Case 1.—Edgar, R., was born in 1910, in Nahan, Sirmoor State, and lived there till 1917, when he came to School at Sanawar.

For the long Christmas holidays (December to February) he always went to his home at Nahan, except in 1922, when he spent a short time at Dehra Dun and in 1925 when he went to Moradabad.

Case 2.—Edward, I., was born in 1911 at Portsmouth. When he came to India he lived with his parents in Mussoorie till 1921, in which year his father died of malignant malaria and he came to school at Sanawar.

During all the years he was at School, he left Sanawar on one occasion only; that was for a fortnight in January 1923, to visit his step-mother in Simla.

Neither of these boys can be traced to have ever visited any of the known endemic areas and hence they cannot be considered as imported infections.

As climatic conditions in Sanawar are not those of a plains station and certainly unlike any conditions normally conducive to the breeding of *P. argentipes*, a short description of the regional conditions of this hill station is given.

Situation.—Sanawar is situated in the Simla Hills, almost midway between the cantonments of Kasauli and Dagshai and nine miles from Kalka in the foothills.

It accommodates the Lawrence Royal Military School, the numerous departments of which are dotted about on the hill-top or just below it.

The population, which is mixed, is made up of the Educational Staff, the Military Staff and the boys, girls, scholars of the preparatory schools and numerous Indian employees.

Height—5,760 feet.

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Average annual rainfall—48 inches.

Soil—Residual soil with large percentage of rock.

Temperature—Mean maximum for the year—77°F.

Temperature—Mean minimum for the year—58°F.

Sub-soil Water Level—No sub-soil water level.

Sandflies.—During the monsoon months and up till the middle of October, sandflies are numerous.

P. major is the only sandfly that has been identified and was discovered to be breeding profusely in an old horse stable.

A newly-built cowshed in the School dairy, which is up to date and a very hygienic structure, was searched several times at night but no specimens were seen.

The object of this article is to draw attention to the possibility of *P. major* being a carrier of kala-azar in India, and to a hill station being an infective focus, with different regional conditions from the present known endemic areas.

(*Note.*—It has been shown by the workers in China that *Leishmania donovani* will develop in the mid-gut of *Phlebotomus major*. Editor, *Indian Medical Gazette.*)

THE GERMICIDAL POWER OF ETHYL ALCOHOL IN SPIRITS.*

By B. B. BRAHMACHARI, D.P.H.,
Director, Bengal Public Health Laboratory.

THE question of what strength of ethyl alcohol can be relied upon to disinfect water is of some importance. In the Government controlled distilleries of Bengal and other provinces, the potable country spirit is distilled at high strength, viz., at about 40 per cent. over proof, and then reduced, i.e., diluted, to issue strengths, i.e., 25 per cent. 45 per cent., 50 per cent. and 70 per cent. under proof. In Bengal, reduction below 70 per cent. under proof is unknown. But in Bihar and Orissa dilutions as high as 72.5 per cent., 80 per cent., and 85 per cent. under proof are official. Now the water used as diluent, drawn from such sources as river ghats exposed freely to contamination may be infected, as with the germ of cholera, especially during epidemics, and to ascertain the limit of dilution that will still be efficient in killing the water-borne pathogenic bacteria and protozoa is a problem of vital interest to the consumers. We had an opportunity to study this question in our laboratory, and the result of the investigation is the subject of this paper. For this opportunity we are indebted to Mr. Jenks, Chemical Examiner for Customs and Excise, Calcutta; it was at his instance that we undertook the work, and he kindly supplied us with the spirits. My thanks are also due to Rao Saheb Gobinda Raju, Assistant Professor of Bacteriology, for helping me in the examination.

Dilution.—The dilutions of the spirits which we received from Mr. Jenks for the investigation were from 60 per cent. under proof upwards. The strength of these liquors and their H-ion concentration were as follows:—

Serial number.	Under proof per cent.	Percentage of ethyl alcohol by volume.	pH
I	.. 60	22.9	7.7
II	.. 70	17.2	7.7
III	.. 72.5	15.75	7.9
IV	.. 80	11.48	7.6
V	.. 85	8.6	7.6
VI	.. 86.3	7.8	7.1

Total bacteria and fæcal bacteria in the liquors.—All the spirits were examined for total bacteria and for the prevalence of fæcal bacilli in them. The methods followed were those for examination of potable water for the same purposes. For the total number of bacteria, 1 c.c. of each was plated out on ordinary nutrient agar and incubated at 37°C. for 48 hours; and for frequency of the fæcal bacilli, quantities of each, varying from 20 c.c. to 0.01 c.c. were inoculated into tubes containing peptone salt water, enriched with lactose and containing neutral red as indicator and bile salt for inhibition of foreign bacteria, these tubes also being incubated for 48 hours at 37°C. All the samples from 60 per cent. under proof to 86.3 per cent. were found sterile; none of the lactose tubes showed fermentation, nor the agar plates any growth. I learnt from Mr. Jenks that the diluent used in these spirits was the filtered water from Calcutta. Still it is remarkable that dilutions so high as 86.3 per cent. under proof, which is only 7.8 per cent. of ethyl alcohol by volume in water, should be not only free from fæcal bacilli but altogether sterile: the Calcutta water at this time gave a growth on agar plates of about 80 colonies per c.c. and showed lactose fermenters in over 10 c.c.

To obtain a definite idea of the action of ethyl alcohol in these dilutions on the total bacterial flora and on the fæcal bacilli that may be present in the diluting water, we prepared 90 per cent. alcohol, made our own dilutions with tank water containing a bacterial count which was countless in 1 c.c. and showing fæcal bacilli (lactose fermenters) in 0.01 c. c. After 24 hours we tested them as above, using for the total counts 0.01 c.c. of each.

Percentage of ethyl alcohol by volume.	Under proof per cent.	Total count.	Least quantity of water in c.c. showing fæcal bacilli (Lactose fermenters).
22.9	60	3	Nil in 60 c.c.
17.2	70	3	" " "
15.75	72.7	10	" " "
11.48	80	Countless	" " "
8.6	85	"	" " "
7.8	86.3	"	1 c.c.
Water as control.	——	"	1 c.c.

Even in 24 hours with water so grossly polluted

* Being a paper read at the Indian Science Congress, Lahore, in January, 1927.

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the liquors were practically sterile in up to 72.5 per cent. under proof, while the fæcal bacilli were eliminated in dilutions even up to 85 per cent. under proof; in the 86.3 per cent. under proof they were reduced to 1|100th in 24 hours, the reduction in the control being to 1|10th.

Pathogenic bacteria.—The bacteria which claim consideration in this connection are *B. typhosus, V. choleræ* and *B. dysenteriæ*. Spore-bearers as *B. anthracis* are rarely spread through drinking water and have been left out as such. The same volumes of the different spirits were taken in glass stoppered bottles and a uniform quantity of 18 hours' broth cultures of the three pathogenic organisms added to each. Inoculations were made from each bottle immediately, after ½ hour, after 4 hours, then daily up to 9 days.

The results were as follows:—

Pathogenic organism.	Dilution p. c. U. P.	Surviving after the exposure of											
		Immediate.	½ hr.	4 hrs.	1 day.	2 days	3 days	4 days.	5 days.	6 days.	7 days	8 days	9 days
B. typhosus ..	60 up	+	—	—	—	—	—	—	—	—	—	—	—
	70	+	+	—	—	—	—	—	—	—	—	—	—
	72·5	+	+	—	—	—	—	—	—	—	—	—	—
	80	+	+	+	+	—	—	—	—	—	—	—	—
	85	+	+	+	+	+	+	+	+	+	+	+	+
	86·3	+	+	+	+	+	+	+	+	+	+	+	+
V. choleræ ..	60	+	—	—	—	—	—	—	—	—	—	—	—
	70	+	—	—	—	—	—	—	—	—	—	—	—
	72·5	+	—	—	—	—	—	—	—	—	—	—	—
	80	+	+	—	—	—	—	—	—	—	—	—	—
	85	+	+	+	—	—	—	—	—	—	—	—	—
	86·3	+	+	+	+	—	—	—	—	—	—	—	—
B. dysenteriæ ...	60	+	—	—	—	—	—	—	—	—	—	—	—
	70	+	+	+	—	—	—	—	—	—	—	—	—
	72·5	+	+	+	—	—	—	—	—	—	—	—	—
	80	+	+	+	+	+	+	—	—	—	—	—	—
	85	+	+	+	+	+	+	+	+	+	—	—	—
	86·3	+	+	+	+	+	+	+	+	+	+	+	+

V. *choleræ* is the most delicate of these bacteria and does not stand even 7.8 per cent. of alcohol for more than one day, while in dilutions up to 11.48 per cent. it disappears in 4 hours. Though even the latter strength would be efficient for *B. dysenteriæ* (Flexner) in 7 days, it is useless against *B. typhosus*. The lowest strength that would eliminate all the pathogenic bacteria, even with such heavy infection as that of the experiment, in 24 hours, is evidently 15.75 per cent. by volume, i.e., 72.5 per cent. under proof.

Pathogens from the animal kingdom.—The only such organism that would count here would be *Entamœba histolytica*, and of this too not the amœbic forms but the cysts. For experiments on the life of the cysts in the spirit solutions, it was essential that the stools used should be rich in them and the findings should be based not merely on the degenerative changes that might possibly be found in them but by feeding tests on cats. On account of dearth of such stools I could not complete this part of the investigation; however, we found that the cysts do not remain suspended in water but settle down completely in 24 hours.

CONCLUSIONS.

In the distilleries of this country, spirits are diluted with water which is freely open to contamination.

The investigation was to find out how far the practice rendered the spirits dangerous to consumers.

The result of the investigation shows that *V. choleræ* does not stand even 11.8 per cent. of alcohol, i.e., 85 per cent. under proof, for more than 4 hours, and in 7.8 per cent. alcohol, i.e., 86.3 per cent. under proof it disappears in one day, *Bacillus typhosus* is more resistant, the limit of safety from it being still 11.48 per cent., i.e., 80 per cent. under proof, in which it does not survive longer than one day. For dysentery bacilli the dilutions should not be more than 15.75 per cent., i.e., 72.5 per cent. under proof, in which they disappear after 4 hours; at the next higher dilution, namely, 80 per cent. they survive for 3 days.

Action of the spirit on the cysts of *Entamœba histolytica* could not be ascertained on account of scarcity of material; as they do not remain in suspension in water but settle down within 24 hours, they cannot possibly reach the spirit with the diluting water.

A Mirror of Hospital Practice.

A LIPOMA OF THE CHEEK AND NECK.

By K. DALEPPA,
Sub-Assistant Surgeon, Demonstrator of Surgery, Darbhanga Medical School.

DIL MAHOMED, a Mahomedan male, aged 45, was admitted to the Banwari Lal Hospital,

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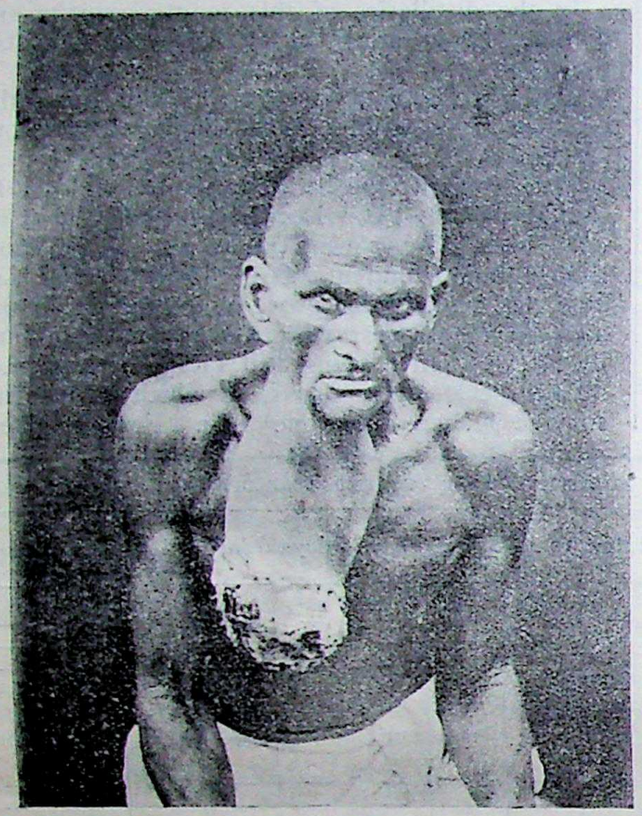
Laheriasarai, Darbhanga, on the 7th January, 1927, for treatment of the condition shown in the photograph.



Before operation.

History.—Three years previously the patient noticed a small tumour, the size of a small nut, on the right side of the face near the lower border of the mandible, and this had increased until it formed the enormous hanging mass shown in the photograph. Neuralgic pains occurred in the area of the tumour, whilst its size interfered with his work in the fields. Three months before admission he had sustained an injury to the dependent lower border of the tumour, which had become ulcerated in this area.

On examination, the patient was of good stature, but not well nourished. His general health and viscera were normal. The tumour, which was ulcerated over its apex, hung down loosely from the level of the zygoma to the level of the umbilicus. It looked smooth, soft, and was semi-fluctuating in consistency. On deep palpation the skin could be moved freely over the tumour, and the tumour itself was not adherent to the surrounding structures. The lymphatic glands draining the area were not palpable. The tumour measured 15 inches in length, and 18 inches in circumference at its middle.

Operation.—On the 14th January, 1927, the tumour was removed by Major C. G. Howlett, M.B., I.M.S., under chloroform anæsthesia. A vertical incision was made over the tumour mass at the level of the lower border of the lower jaw. The tumour shelled out readily, as it was not adherent to the deep structures. The incision was stitched up, except for a gauze drain inserted into the lower angle of the wound, and removed 24 hours later. The stitches were removed on the 9th day, and except for a small superficial ulcer at the angle of the jaw, the patient made an uneventful recovery. He was discharged with a much happier expression than he had come in with. On pathological examination, the tumour proved to be a lipoma.

I must express my thanks to Major C. G. Howlett, M.B., I.M.S., Superintendent of the Banwari Lal Hospital, and to Capt. R. P. Ghosh, M.B., Teacher of Surgery, Darbhanga Medical School, for their kind permission to publish these notes.

A CASE OF FOREIGN BODY IN THE LARYNX.

By S. N. MUKERJI, F.R.C.S.,
MAJOR, I.M.S.,
Civil Surgeon, Chittagong.

A MAHOMEDAN female child aged 9 years was playing with a piece of lead about $\frac{3}{8}$ inch long in her mouth. It suddenly got into her larynx. She was immediately brought to the General Hospital, Chittagong, by Capt. K. Sen, M.B. at about 7 p.m. on the 9th August, 1925. She was screened under the *x*-rays by Assistant Surgeon Rai Bahadur J. N. Chatterji. The foreign body was lying in the larynx. I found the child in severe dyspnœa, and I immediately performed a high tracheotomy. There was only one infant size tube available and no tracheal dilator. A dressing forceps was used as a dilator. A silver probe was bent and passed upwards through the tracheal opening but the foreign body could not be felt. She was put to bed for the night. Next day her temperature rose to 103. So she was left alone for two days. On the 12th I tackled her again but failed to extract the foreign body. I could feel the foreign body by passing one finger into the gullet from the mouth. There was no children's size laryngeal forceps available. On the 14th August, 1925, I screened her myself and found the foreign body lying transversely in the larynx just above the vocal cords.

On 15th August, 1925, I put her under chloroform. A gag was put into her mouth. I passed a children's size œsophageal forceps in the reversed way through the tracheal opening, as its curve best suited the case, and my left index finger into the gullet. The foreign body was caught and by manipulation brought down a little. By keeping the finger in the gullet and pressing down the foreign body, I finally caught it with a Spencer Well's forceps and gently brought it out through the tracheal wound. The upper part of the wound was stitched but the stitches did not take.

There was no bleeding and no difficulty in extracting the foreign body through the tracheal wound. On 17th August, 1925, I made her speak

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with some dressing on the wound and pressure of the hand over it. There was no change in the voice.

She then developed signs of basal pneumonia. The wound healed by granulation.

She finally went out of the hospital completely cured on the 8th September 1925.

A CASE OF STIFF JAW AFTER CANCRUM ORIS—SURGICAL INTERFERENCE—CURE.

By S. N. MUKERJI, F.R.C.S.,
MAJOR, I.M.S.,
Civil Surgeon, Chittagong.

AN Indian Christian boy of 13 was brought to the General Hospital, Chittagong, on the 17th May, 1926, for the treatment of a stiff jaw from which he had been suffering for six years.

Six years ago he suffered from kala-azar with cancrum oris. He was cured of kala-azar but unfortunately his jaws remained permanently fixed. There was hardly any space between the upper and lower teeth. The general health of the boy was good, but he could not open his mouth at all. He lived on liquids only.

Three attempts were made under chloroform to open his jaw with a gag, but they all failed. The jaws only opened 1|8th of an inch.

On the 21st July, 1926, when he was under chloroform, a hard substance covered with soft tissues was felt on the right side connecting the two jaws just behind the second molar tooth. The mucous membrane was incised and with a gouge the hard substance was broken through. It was found to be bony in nature. The whole of it was then removed. With the pressure of a gag the jaws opened out widely for the first time after six years. He lost four teeth during the primary attempts to open the jaws. The boy was then given a wooden screw top to keep between his teeth and told to try to open out the jaws himself. He was very much disinclined to do this. It had to be forcibly done. When he left hospital he could open his mouth fairly well.

This is the first case of the kind I have come across. Lieut.-Col. Sir Frank Connor told me that when he came to Chittagong last year he had a similar case in a girl. It would be interesting to know how many of these cases of stiff jaw after cancrum oris are due to bony attachment between the two jaws. I must admit that I did not look for this condition at first.

A CASE OF CIRSOID ANEURYSM OF THE DORSALIS PEDIS ARTERY.

By A. K. DUTT GUPTA, M.B. (Cal.), D.T.M. (Ben.),
Assistant Surgeon, Medical College Hospital, Calcutta.

CIRSOID aneurysm, though classed under the group of aneurysms, really consists of wide tortuous and tangled pulsating vessels. Its etiology is unknown. The affection is most common in the scalp—occasionally in the deeper situations, such as the orbit. The following case is therefore interesting from the most uncommon site of the affection, as well as the history.

Patient H. M., aged about 14 years, came for consultation with the history of severe and prolonged hæmorrhage whenever he accidentally cut his right big toe. The wound was always most trivial, having mostly occurred while bathing in a pond from some sharp object in the mud. There was no history of similar bleeding from the left foot or other toes of the right foot, even though the abrasions there were more severe.

On examination, a swelling was found on the inner side of the dorsum of the right foot, which was hot, pulsating, slightly expansile. It could be moved from side to side and the feel was that of thickened, distended and tortuous vessels. It commenced from the front of the ankle and extended nearly up to the end of the metatarsal bone. There was a distinct systolic bruit all over and on pressing the dorsalis pedis artery over the ankle, the pulsation almost ceased over the swelling. The first dorsal metatarsal artery on the medial side of the big toe was much bigger than normal, but there was no tortuosity. The skin overlying was normal. There was no pain or any discomfort.

On further examination no abnormality of the vessels of the same leg or of other parts of the body could be detected. The patient was advised surgical operation for fear of another serious hæmorrhage happening, but this was refused.

A CASE OF ACUTE YELLOW ATROPHY OF THE LIVER.

By K. J. SHIVDASANI, L.M.S., B.M.S.,
Medical Officer, Special Prison, Shikarpur, Sind.

P. D., a Mahomedan male convict of comparatively light build, aged about 24, employed on comparatively light work, was admitted to hospital on the 23rd January, 1927, complaining of general malaise and feverishness. His temperature on admission was 97·2°F., and he was detained in hospital under observation.

24th January.—Temperature 97·2°F. Conjunctivæ yellow. Patient complains of yellow vision. Tongue coated. Spleen and liver not enlarged. Urine greenish-yellow in colour. Pupils dilated. Patient very dull, and lying quietly, completely covered by his blankets. He was given calomel and sodium bicarbonate, and quinine mixture. The temperature that evening was 96·2°F.

25th January.—Morning temperature 96·2°F. Patient delirious. Bowels not moved. Pupils contracted. Icteric colour of the conjunctivæ very deep. Treatment; an intramuscular injection of grs. 10 of quinine hydrochloride. After the injection, the patient went to sleep, but woke up violently delirious and tried to run away. He was given a sleeping draught.

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In the evening the patient passed into a state of deep coma. The pulse was fairly good, but slow. The bowels were not moved, and there was retention of urine. About 20 ozs. of dark yellow urine were removed by catheterisation, and an enema given, but without effect.

26th January.—Patient deeply comatose. Very high coloured blood-stained urine was twice passed involuntarily in bed. The bowels were not moved. A thermometer placed in the armpit showed no rise of the mercury. Extremities cold. Subcutaneous ecchymoses appeared over the chest, abdomen, and arms. An intravenous injection of Icterosan (Schering) was given; also a glycerine enema.

In the afternoon the patient was moribund, with respiration failing, but the pulse still steady. He died at 10 p.m.

Post-mortem.—After death a partial post-mortem examination was held. The eyes were deeply jaundiced. There were blotches of ecchymosis all over the abdomen, chest, arms and thighs. The abdominal cavity contained about 20 ozs. of sanguineous fluid. There was a big patch of hæmorrhage in the wall of the transverse colon where it was in contact with the liver. The liver was small, soft, yellow in colour and cut easily. The spleen was not enlarged.

Discussion.—The case was suspected to have been one of acute yellow atrophy of the liver before death, on the appearance of the subcutaneous ecchymoses; and the post-mortem findings appear to confirm this. These notes on the case are published on account of the rarity of this condition. Interesting points in the case were the sudden onset, the short and quite afebrile course, the deep jaundice, coma and delirium, the subcutaneous hæmorrhages, and the small size of the liver. The spleen is stated to be usually enlarged in cases of acute yellow atrophy, but in this case it was not enlarged.

I am grateful to M. R. Kalani, S. M. S. Officer, who was in charge of the case for his careful notes and for carrying out the post-mortem examination.

TWO CASES OF *ASCARIS LUMBRICOIDES* INFECTION SIMULATING CHOLERA.

By M. BAROOA, L.M.P. & C.,
Mancotta Tea Estate, British India Tea Co., Dibrugarh, Assam.

RECENT reports in the *Indian Medical Gazette* of *Ascaris* infection giving rise to symptoms simulating cholera prompt me to send in notes of the following cases:—

Case 1.—A Hindu girl, aged 14 years, was admitted to hospital on the 25th July, 1926, with the symptoms of cholera, and was immediately put on to essential oils' mixture. The same evening she vomited a roundworm. I surmised that the symptoms might be due to *Ascaris* infection, and that night gave her a dose of santonin in an ounce of castor oil. To my surprise she passed a large number of roundworms, and continued to do so during the next three days. On the fifth day after admission to hospital a further dose of santonin, followed by castor oil, was given, but no further worms were passed. She was discharged cured on the 7th of August.

On the 11th of September she was re-admitted to hospital with a recurrence of symptoms suggestive of cholera. Treatment with santonin was immediately instituted; more roundworms were passed; and she again recovered. Since that date she has been in good health.

Case 2.—On the 29th June, 1926, a male Hindu adult was admitted to hospital with symptoms of choleraic diarrhœa. As his wife and step-mother were already in hospital suffering from similar symptoms, the state of affairs was most suspicious of household cholera infection. The patient, however, gave a history of having that day vomited a roundworm. I accordingly gave him treatment with santonin and castor oil; he passed a number of roundworms; and was discharged cured from hospital on the 7th July.

His wife and step-mother had almost recovered from their choleraic symptoms when the patient was admitted to hospital; but, in view of what had happened in his case, I administered santonin to both. Contrary to my expectation, both passed a (small) number of roundworms, which may possibly have been responsible for their symptoms.

AN INTERESTING CASE OF MALARIA.

By CAPT. S. B. MUKERJEE, M.B.,
Civil Medical Officer, Kurseong.

A MALE European baby, seven months of age, arrived in the hills from England *via* Bombay, and stayed there for six weeks. He was then taken down to Suknea in the Terai and stayed there for less than a week. He was then brought back to Kurseong in the hills.

Within a fortnight after his return to Kurseong he developed fever, which was attributed to "teething." I saw the child on the third day of fever, when I found him pale, restless, and having a rigor. The spleen was not palpable, but the history given was one of intermittent fever with sweating. On examination of blood films from the patient a heavy infection with *Plasmodium vivax* was found, all phases of the parasite being present. The patient recovered on quinine administration.

The interest of the case lies in that:—

(1) The infection was clearly contracted in the Terai, a notoriously infected tract.

(2) The incubation period can be definitely put down at less than 14 days.

(3) The reprehensible practice of attributing any fever at this age of life to "teething."

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Indian Medical Gazette.

JULY.

SOME PROBLEMS IN RABIES.

WE have received from Dr. D. A. Turkhud, M.B., C.M. (Edin.), lately Director of the King Institute of Preventive Medicine, Guindy, Madras, a letter which raises problems which are a constant source of difficulty to medical practitioners in India. We make no apology for dealing with Dr. Turkhud's letter in our editorial columns, since the issues raised are of considerable importance. He writes as follows:—

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—It is an acknowledged fact that among persons bitten by a rabid animal, some do not develop hydrophobia although they undergo no antirabic treatment; the proportion of such cases however is uncertain. Their escape is probably due to various factors, such as the nature of the bite inflicted, the attenuated or even avirulent character of the virus present in the saliva of the animal, the quantity of saliva deposited in the wound, and possibly may even be the result of a natural immunity. It would be interesting therefore to know in this connection whether there are any authentic instances on record where hydrophobia has occurred in man as the result of a rabid dog or any other rabid animal simply licking a scratch or abrasion on the skin or mucous surface. There is very little probability of such cases being found among the records of the various Pasteur Institutes for if infection did take place in this way it would be neutralised by the antirabic vaccine injected. On the other hand, there might be instances where the treatment had not been carried out and hydrophobia had resulted. Such cases, however, are more likely to come to the notice of hospital authorities or general practitioners.

Some years ago Lieut.-Col. W. F. Harvey, C.I.E., I.M.S., when he was Director of the Central Research Institute at Kasauli, contributed a valuable paper in which he pointed out that in 'licked' cases the chance of development of hydrophobia was practically *nil*, and expressed his authoritative opinion that antirabic treatment was quite unnecessary. The virus of rabies, it appears to me, needs anærobic conditions for its growth, and—like the *B. tetani*—requires a certain amount of actual penetration into the tissues and possibly some local damage as well, before it can multiply in the nerve substance of the person bitten. If the virus be considered from this point of view, then Colonel Harvey's advice that there is no necessity for carrying out antirabic treatment in those persons in whom a mere scratch or abrasion has come into contact with the saliva of a rabid animal, appears to be perfectly sound. This opinion however is not generally shared, and the usual practice is to send all such cases to the nearest centre, where they receive full antirabic treatment.

I think therefore that authentic information as to whether hydrophobia has ever resulted from the lick of a rabid animal on a scratch or abrasion, is very necessary for medical men, to enable them to arrive at a definite conclusion as regards the advice to be given in such cases, and also for the guidance of those who are in charge of the various antirabic treatment centres now opened throughout India.

In this connection, information on the following two additional points would also prove helpful. Has hydrophobia ever occurred after bites from rabid horned cattle? For it has been stated that herbivora, although they may themselves suffer from rabies, are incapable of transmitting the virus to man. Secondly, have hydrophobic patients ever communicated the infection to other human beings through the saliva?—Yours, etc.,

D. A. TURKHUD.

"IFFLEY," KODAIKANAL,
SOUTH INDIA.
30th March, 1927.

Dr. Turkhud's letter raises several points of importance to medical practitioners in India. It is curious that apparently instruction with regard to rabies is not specifically included in the M.B. curricula in India generally, since medical practitioners in this country are constantly called upon to give advice in the matter. Possibly owing to this want of teaching, the medical profession in India is very ignorant with regard to rabies and its problems, and certain general misconceptions prevail.

The first of these is a general belief that every person bitten by a rabid animal will develop hydrophobia unless he receives antirabic treatment. This is emphatically not true. There are a dozen and one reasons why such a person should escape. Infection with rabies is acquired by the bite of the rabid animal, and unless the virus is implanted on to a nerve ending or into nerve tissue infection does not take place. (Hence the greater danger of multiple bites and of bites on richly innervated areas such as the face). Once implanted in nerve tissue, the virus travels up the afferent nerves to the central nervous system, which it quickly saturates. From the central nervous system it travels out via the efferent nerves and into the salivary glands and other tissues which are richly innervated, and those tissues which are most richly innervated are those which are most infective. But, as was shown by Cruickshank and Wright (1914) the truly rabid dog, foaming at the mouth, may die before the virus has reached its salivary glands, and bites from such an animal are devoid of risk, even though the animal has true rabies. Secondly, a superficial abrasion with the teeth may fail to lodge the virus in contact with nerve tissue. Or the virus may be wiped off on the patient's clothing, or destroyed by antiseptics or caustics. The mortality from hydrophobia amongst those bitten by rabid animals, but not treated is therefore nothing like cent per cent.

It is very difficult to assess accurately what this mortality is. For twelve years Colonel Cornwall at the Pasteur Institute of Southern India has been collecting figures in this connection, and his findings are analysed in the annual reports of that institute for the years 1924 and 1925. Every year it happens that of a group of persons bitten by a rabid animal none come to the Institute for treatment until one or more of their number has died of hydrophobia; this alarms the other persons who were bitten, and accordingly some of

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them come for treatment. In such instances, inasmuch as one or more deaths from hydrophobia have occurred in the group of persons bitten, it is certain that the biting animal had rabies, and also that it was infective at the time of biting. The total figures collected are as follows:—

"Years 1912-1924.

Number of persons bitten.	431.
Number of them not treated.	283.
Deaths from hydrophobia among the treated.	151.

Mortality from hydrophobia, calculated on the total number of persons bitten 35 per cent."

We may conclude therefore that of persons bitten by undoubtedly infective animals and not treated, the mortality is somewhere in the neighbourhood of 1 in 3. Possibly different strains of the rabies virus differ in their infectivity towards man.

Cornwall's figure is a good deal higher than the figures of other authors. Harvey and Acton (1922) collected data at the Pasteur Institute of India. Their method was to ask each patient who came for treatment for the names and addresses of all other persons bitten by the same animal, but who had not come for treatment. They then wrote to the civil authorities in the district concerned, asking them to report three months later as to whether these persons were still alive or had died from hydrophobia. The percentage mortality rate from their figures worked out at 10·7 per cent. Hoëgyes in Hungary reported a death-rate of 15 per cent. among 985 persons bitten, but not treated. Babès in Rumania considers Hoëgyes' figure to be too high and is "persuaded that even the figure 10 per cent. is exaggerated, and that it is nearer 5 per cent. of persons bitten by rabid dogs and not treated."

A second general misconception prevalent is that every person who is treated at an antirabic centre is certain to escape hydrophobia. This again is not true. There is a constant small mortality from hydrophobia amongst the treated; thus at Kasauli for years 1920 to 1925 the total death-rates among the treated were 1·0, 0·91, 1·0, 0·99, 0·78, and 1·78 per cent. respectively; these figures being for total deaths and not only for "failures of treatment" (i.e., for those dying more than 15 days after the completion of treatment).

If, then, we try to assess the efficacy of antirabic inoculation we come to a problem of great difficulty, and one on which great diversity of opinion exists. The population under treatment at a Pasteur Institute is a "mixed bag." It includes

(a). persons bitten by undoubtedly rabid and infective animals, and at considerable risk,

(b). persons bitten by animals which have not been traced, and where the degree of risk is not known,

(c). persons bitten by animals which were probably not rabid at all,

(d). 'lick' cases, which are practically speaking at no risk at all. The vast majority of the 'lick' cases are Europeans.

Amongst such a mixed population, the hydrophobia rate after treatment is in the neighbourhood of 1 per cent. Amongst persons bitten by certainly rabid animals and not treated the various figures given range from 5 per cent. to 35 per cent. It is not unnatural therefore that different authors should come to different conclusions. Thus McKendrick and Fox (1917) write as follows: "Proof of the beneficial effects of treatment can only be arrived at by comparative methods, and consequently the results obtained can only be of a comparative nature.

1. We have found evidence of the handicap of late arrival as shown by an increased mortality in cases of persons bitten on the face and arm, that is to say amongst those cases in which the expected incubation period is relatively short and the handicap is consequently a heavy one.

2. We have found similar evidence amongst those whose bites are multiple.

3. And we have found evidence of a lengthening of the incubation period amongst cases, the issue of which was fatal, in spite of early arrival."

Harvey and Acton (1922, 1923), in the conclusion of a long statistical and experimental memoir on the subject, write as follows; "One fact seems to stand out clearly, which is that some protection from infection is afforded by the use of the rabies virus in subcutaneous inoculations. Our statistical results in man show that carbolised vaccine has given in our hands as good results as either of the dried cord treatments. Our experimental work comes to the assistance of the statistical finding and confirms it. A further point brought out by our statistical investigations is that legislation is highly effective in reducing the mortality from rabies. A thoroughgoing campaign against the animal which transmits the infection seems to be the most logical method to adopt for elimination of that infection." In this passage one would like to underline the qualifying word "some." Harvey and Acton are studiously restrained in their conclusions, but the whole trend of their work is to show that antirabic inoculation has not the tremendous value so often ascribed to it.

Cornwall (1926) concludes "It is clear that a considerable number of persons must have come for treatment who either had been bitten by dogs which were not rabid, or had sustained injuries of such a trivial nature that infection could not occur.....We find that only 10,500 persons out of the 30,208 treated were at risk, and that therefore 19,708 persons were treated unnecessarily. Unnecessarily, as

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it is now shown; but at the time it could not be decided from the history given that the biting animals were certainly not rabid and that the applicants had run no risk of infection. Moreover, all these people thought that they were at risk and wished for the treatment to ease their minds.....One-fifteenth of the total number of applicants for treatment were at a very formidable degree of risk. Unfortunately it is not practicable to pick out and identify with certainty the persons who are at great risk from the number of those who apply for treatment, so that, in order that the one who really needed it might not be missed, fourteen persons who did not need it had to be treated also."

It is important at the present time, when the issue of antirabic vaccine from Pasteur Institutes to district and headquarter hospitals in India is becoming more and more the custom every year, that the medical profession in this country should know the true facts, and that misconceptions should be removed. The treatment has "some" efficacy; it is difficult to say how much; but the mortality after treatment, which is in the neighbourhood of 1 per cent, is not a formidable one. Further, until the micro-organism of rabies is discovered and isolated in artificial culture media, it does not appear to be likely that the position can be improved upon.

For the crux of the rabies problem is the non-discovery of the causative micro-organism. Noguchi (1913) claimed to have cultivated the virus of rabies *in vitro*. In a specially prepared fluid medium a piece of infected brain from a rabid dog is placed in contact with a piece of brain from a healthy rabbit. Enormous numbers of tiny granules, lying in masses, are seen, and the piece of healthy rabbit brain becomes infective and capable of transmitting the infection on sub-dural inoculation into rabbits. This work of Noguchi's lacks confirmation, however. At the Pasteur Institute of India in 1914, in work which has not been published since it led only to negative results, Colonel Acton and the writer spent some months trying to confirm Dr. Noguchi's observations, but were quite unable to do so. In control tubes put up in a similar manner but with only healthy brain substance in them, the same appearance of enormous numbers of tiny granules of varying size was seen, and it appeared as if they were simply the results of disintegration of brain cells in the culture fluid. Further, sub-dural inoculation of fluid from the infected tubes into rabbits was not followed by rabies.

Levaditi, Nicolau and Schoen (1924) believe that the micro-organism of rabies is a microsporidial parasite which enters the body in some invisible stage and eventually produces the Negri body. Manouelian and Viala (1924) claim to have demonstrated in the cells of the brain and salivary glands of rabid dogs very minute organisms, similar to *Encephalitozoon cuniculi*, a minute parasite which causes spontaneous paralysis in rabbits, and have named the supposed parasite *Encephalitozoon rabici*. In a later paper Levaditi, Nicolau and Schoen (1924a) claim to have confirmed the observations of Manouelian and Viala, and state that the Negri body is the cyst phase of the parasite, which they rename *Glugea lyssae*. The illustrations given by Manouelian and Viala however are not very convincing, whilst the evidence that the supposed parasite is a protozoon is completely wanting. At present it cannot be stated definitely that the micro-organism of rabies has been discovered. As Acton and Harvey (1911, 1913) have shown, the Negri body of rabies is in all probability a lifeless cell-inclusion; though Cornwall (1925) does not agree with this view. He believes that the "spores" of the rabies virus find their way into the nerve cells and increase in size until they become visible Negri bodies. These grow and if the rabid animal lives long enough vacuoles appear within the Negri body, each containing a "corpuscle" of no regular form. Having attained its maximum size and having become filled with ripe spores by internal division, the limiting capsule of the Negri body splits and allows the corpuscles to emerge into the cell cytoplasm.

Until the micro-organism of rabies has been discovered and cultivated *in vitro*, it is likely that we shall have to go on relying for immunization purposes on the only antigen available, the brain of the "fixed virus" rabbit. But with the widespread issue in India of antirabic vaccine outside Pasteur Institutes, it is important that the medical profession in this country shall have a clear idea of what to do when consulted by persons bitten by rabid or suspected animals.

The first duty of a medical man when consulted by such a patient is very thoroughly to cauterise the wound. The most efficient caustic for this purpose as experiments prove is pure carbolic acid, and the cauterisation must be very thorough. Each tooth mark must be treated separately, and the carbolic acid must be worked into the full depth of the wound. In cases of multiple and extensive wounds and in badly bitten children a general anæsthetic should be given. Efficient cauterisation is the first and by far the most efficient line of defence against hydrophobia.

The second proceeding, if possible, is to get hold of the animal which inflicted the bite. It should on no account be killed, but should be kept chained up under observation for ten days. If the biting animal is alive and well on the tenth day, it cannot possibly have been suffering from rabies when it inflicted the bite, and antirabic treatment will not be necessary.

Often, however, it is not possible to secure the biting animal, and the majority of cases

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perhaps are persons bitten by dogs or jackals which cannot be traced. The medical man is then faced with the decision of whether to send the patient for antirabic treatment or not.

Certain cases present no difficulty. Thus in the following cases the patient should be sent for antirabic treatment at once;

1. If bitten by a dog showing symptoms of rabies.

2. If bitten without provocation by a dog which cannot be traced.

3. If attacked without provocation by a jackal, or bitten without provocation by a cat, which cannot be traced.

4. If the saliva of a rabid animal has come into contact with fresh, open, recent, cuts and abrasions. Abrasions which are of more than 24 hours' standing have a healthy barrier of granulation tissue over them, and are not liable to infection.

5. If bitten or infected on fresh, open abrasions by an animal within ten days of its death, the cause of death of the animal not being known; especially if the animal's illness was of short duration, e.g., 2 to 5 days.

6. If scratched by the claws of a rabid animal, since the claws will probably have been covered with infective saliva.

7. If bitten or infected by a patient with hydrophobia.

8. If the patient is very badly bitten, or is bitten on the face, the biting animal being still alive and under observation. As the incubation period of hydrophobia is short in such cases, it is better to send the patient for treatment. Should the biting animal be alive and well on the tenth day, treatment can be discontinued; whereas if the animal dies, one has the satisfaction of knowing that there was no delay in instituting treatment.

Other cases are more difficult. Such as

1. Persons bitten by a rabid horse, cow, goat, or other herbivorous animal. As far as one knows, there is no instance in the literature of hydrophobia following the bite of a herbivorous animal, but one cannot absolutely exclude such a possibility.

2. Persons who have drunk the milk of a rabid animal. Treatment is not necessary, as the milk is not infective.

3. Pregnancy, and the co-existence of other illness, unless severe, are not contra-indications to treatment.

Finally, there come the 'licks.' These give the medical man more trouble than all the rest put together. As far as one knows, there is no authenticated case in the literature of hydrophobia following a lick. A definite case of hydrophobia following the implantation of rabid saliva on fresh abrasions was recorded some years ago—by Colonel Cornwall, if we remember rightly. A sergeant in a British regiment had made a pet of a pariah dog. The dog developed rabies and bit its master; he was sent for treatment and did not develop hydrophobia. A brother sergeant of his took the rabid dog on a chain to a veterinary surgeon for inspection. The dog did not bite him at all, but struggled violently at the chain; the patient's hands were abraded by the chain and probably saliva from the dog's mouth was present on the chain. The man thought nothing of the matter and did not report it. He received no antirabic treatment, and died later of hydrophobia. In this instance in all probability rabid saliva had come into contact with fresh, open abrasions made at the time, and it is easy to understand how implantation on to a nerve terminal could take place under such circumstances.

The circumstances of an ordinary 'lick' however are quite different. The patient is almost always a European and mentally much upset. There is no doubt that 99 out of every 100, if not 999 out of every 1,000 such cases are at no risk at all. They run much more risk of getting involved in a railway accident on the way to a Pasteur Institute for treatment than they do of developing hydrophobia. Yet it is usually useless to tell them so. The only possible policy for the medical man under such circumstances is to throw the onus of the decision on to the patient. Inform him of the facts; especially look whether he has any fresh, recent, and open abrasions on his hands. Tell him "If the saliva has come into contact with any recent, fresh, open cuts or abrasions, treatment is advisable; otherwise it is absolutely unnecessary." A phrase which the writer has found most useful with this class of patient is to remark "I would not dream of undergoing treatment myself under the same circumstances." This will often decide a waverer, and save unnecessary treatment.

. . . . . .

We would welcome replies to the specific questions put by Dr. Turkhud, but we may remark that we do not want second-hand stories of "things heard, but not seen;" or vague reports of cases which may have died of hydrophobia or of something else. Authenticated information however will be welcome.

R. K.

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SPECIAL ARTICLES.

DIFFICULTIES IN THE EARLY DIAGNOSIS OF THE TYPHOID GROUP OF FEVERS.*

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FROM the Middle Ages this disease has been known, as will be noted from recorded observation of the diagnosis of the disease and death of the father of the Earl of Essex in Ireland in 1576 from "epidemic dysentery."

Richard Bright in 1827 described it as typhus fever with bowel complications.

The typhus group of fevers was bounded by uncertain landmarks until Jenner in 1853 first established the essential pathological differences between typhus and typhoid fever, on the basis of the lesions in the small intestine.

The clinical manifestations of the tropical fevers, with the many and varied complications prevalent in the tropics, bewildered our predecessors in Bengal, no matter how careful and accurate were their clinical observations; as my experiences here for so many years in the tropics bring out.

Crombie divided all fevers seen in Calcutta into

1. Those of short duration—simple continued fever of short duration.
2. Those of long duration—simple continued fever of long duration.

Then attention was called to another fever referred to by Manson and considered to be a separate entity—called in those days ("Dum-Dum", "Burdwan,"), "Non-malarial remittent fevers" of the plains, with a duration of 6 to 8 weeks; characterized by bilious diarrhœa, head symptoms, and congestion of the lungs.

This resembles many cases we now see as unmistakable cases of typhoid fever, some of which end fatally. The laboratory having given positive findings for typhoid in the earlier stage, often succeeded at about the 15th to 20th day in getting streptococcal cultures in the blood—the condition that followed being apparently one of streptococcal septicæmia supervening on the typhoid infection. The importance of this we refer to later, (Chart A).

Then came Eberth in 1881 with the discovery of the infective bacillus, and subsequent to that date each period of five years has been marked by some definite progress in the accuracy of laboratory technique in elucidating the etiology of cases of fever which clinically might prove obscure.

The disease is a serious one, especially for the newly arrived European. The death-rate from the typhoid group in Europe works out at somewhere about 12 per cent. In India it is about 10 per cent. among Indians and 25 per cent. among unprotected Europeans, but in both some 25 per cent. show complications of some kind or other.

If, as some of us claim, we have made as measurable advances in treatment as the laboratory worker has in his technique, then the importance of early diagnosis with a view to appropriate treatment can be readily inferred. The more recent advances in therapeutics have been successful in reducing our mortality to between 2 to 3 per cent. and the complications by prevention rather than by their amelioration when they appear. The policy of drifting and leaving all to the nurse and Nature has now been definitely abandoned.

Relapses.—After the drop of temperature towards the end of the third week, there are cases in which it rises again and runs through one, and more rarely more than one, typhoid-like courses.

In days previous to accurate bacteriological findings all these were grouped under one general heading "typhoid relapses." But in the present day with the advanced laboratory technique, just as it has been found that a typhoid-like febrile course does not ncessarily mean *B. typhosus* infection or even infection by one of the organisms of the same group, the so-called relapse may as well be either the actual recrudescence of the typhoid group of infection or some other condition producing a typhoid-like fever.

Our experience with a large number of cases of typhoid fever under careful bacteriological observations at frequent intervals has been that in the secondary fever the actual relapse of the typhoid group of infections is singularly uncommon.

The secondary rise is often due to

(i) Kala-azar supervening on typhoid.

(ii) Secondary streptococcal infection, the organism entering the blood stream through the breaches in the intestinal mucous membrane. This represents a very large percentage of all the fatal cases.

(iii) *B. coli* bacteræmia.

Importance of early bacteriological diagnosis. Thus it will be apparent that unless during the initial stage a diagnosis has been made on *positive findings* such as the actual isolation of the typhoid group of organisms, when the secondary infection is superimposed it will so obscure

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the whole picture that its true nature will be hardly recognised.

By specific therapeutic agents it is often possible to cut short these secondary infections if properly diagnosed, and when such a diagnosis is possible it is simply futile to wait and see with a comfortable feeling of ignorance and drift and with the hope that sometime Nature may settle the affair.

I would lay great stress indeed on this intelligent anticipation of conditions which may threaten the successful fight put up by the body against the organism, especially in the prevention of heart failure, the prevention of hyperpyrexia, the prevention of sapremia—either of bacillary or of metabolic origin—through the hundred and one ulcers of the intestinal canal, and especially the prevention of the passage through it into the blood stream of streptococci or coli bacilli, causing a definite septicæmia which has such a high percentage of mortality.

And I would like to impress on all the importance of recording all early definite findings—blood counts and culture included—in ascertaining the causation of relapse.

If, during the first week, blood culture has not been done, an opportunity is missed for obtaining the causative organism, whilst *Leishmania* flagellates may develop in culture by about the 21st day, just the date of the second rise of temperature after defervescence, which will greatly complicate prognosis and treatment. Further, if in the first week no blood count has been done, then when the rise of a so called relapse comes, a comparison will not enable you to suspect the presence of kala-azar, the successful treatment of which is very largely helped and assisted by very early diagnosis and antimony injections.

The importance of recording early findings too is that it helps to elucidate cases of mixed infections—kala-azar and paratyphoid, *B. coli* infection and typhoid; typhoid and streptococcal septicæmia.

Preliminaries:

Figures have been worked out from the records of the Medical College Hospital for the last four years (1923-1926), comprising 286 inpatients and 140 cases outside the hospital. The basis of diagnosis had been either

(1) Isolation of the causative organism from the blood, (in most cases), or from the urine or stool in a smaller number of cases.

(2) Positive agglutination test for *B. typhosus* in at least 1 : 80 but mostly in higher dilutions;

Paratyphoid A at 1 : 20;
Paratyphoid B at 1 : 1000;

the standard laid down by Harvey and Walsh.

In previous years *attempts* and in cases of failures *repeated* attempts were not made in all cases of continued fever to come to a positive diagnosis by accurate bacteriological findings.

Incidence of the Disease.

The incidence in these cases was as follows:—

Typhoid	 79	per cent.
Paratyphoid A	.. 15·7	per cent.
Paratyphoid B	.. 4·6	per cent.
Paratyphoid C	.. 0·65	per cent.

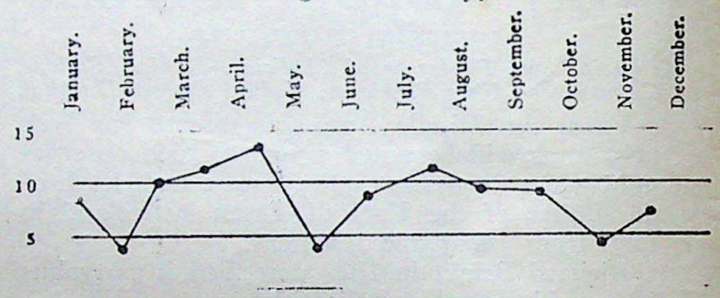
Infections with the bacillus of Gærtner and with the *Bacillus fæcalis alkaligenes* were very rare, and are not included in this table. The actual incidence of paratyphoid fevers is probably higher in reality, as, owing to the mildness of the symptoms in these infections many cases do not come under the observation of medical men and are often not diagnosed at all.

Race and Nationality.

Europeans, and Anglo-Indians	39.7	per cent.
Indian Christians	13.9	per cent.
Hindus	29.8	„
Mohamedans	5.2	„
Jews and Chinese	11.2	„

Age Incidence.

The youngest patient was an Anglo-Indian male child of 8 months of age, with *B. typhosus* in the



blood culture. The most usual age is from 10 to 15 years.

Seasonal Incidence.

	Percentage.
January	9.3 per cent.
February	4 „
March	10 „
April	10.3 „
May	13.2 „
June	4 „
July	8.5 „
August	10.5 „
September	9.2 „
October	9.2 „
November	4.6 „
December	7.2 „

There appear to be two chief periods of incidence, one at the end of the cold weather and one during the early rains, but the more prolonged period is in the autumn.

Difficulties in the Diagnosis.

The early accurate diagnosis is important

(1) *For the patient,* as it then gives him the better chance of cure, and, as has been pointed out before, the so-called relapses are much better understood and can be dealt with.

(2) For the community, in preventing the spread of the disease.

Difficulties arise

(1) From the anomalous signs of the disease itself.

(2) From other diseases simulating it.

This makes it imperative that *bacteriological* diagnosis should be made in every case where facilities exist for it.

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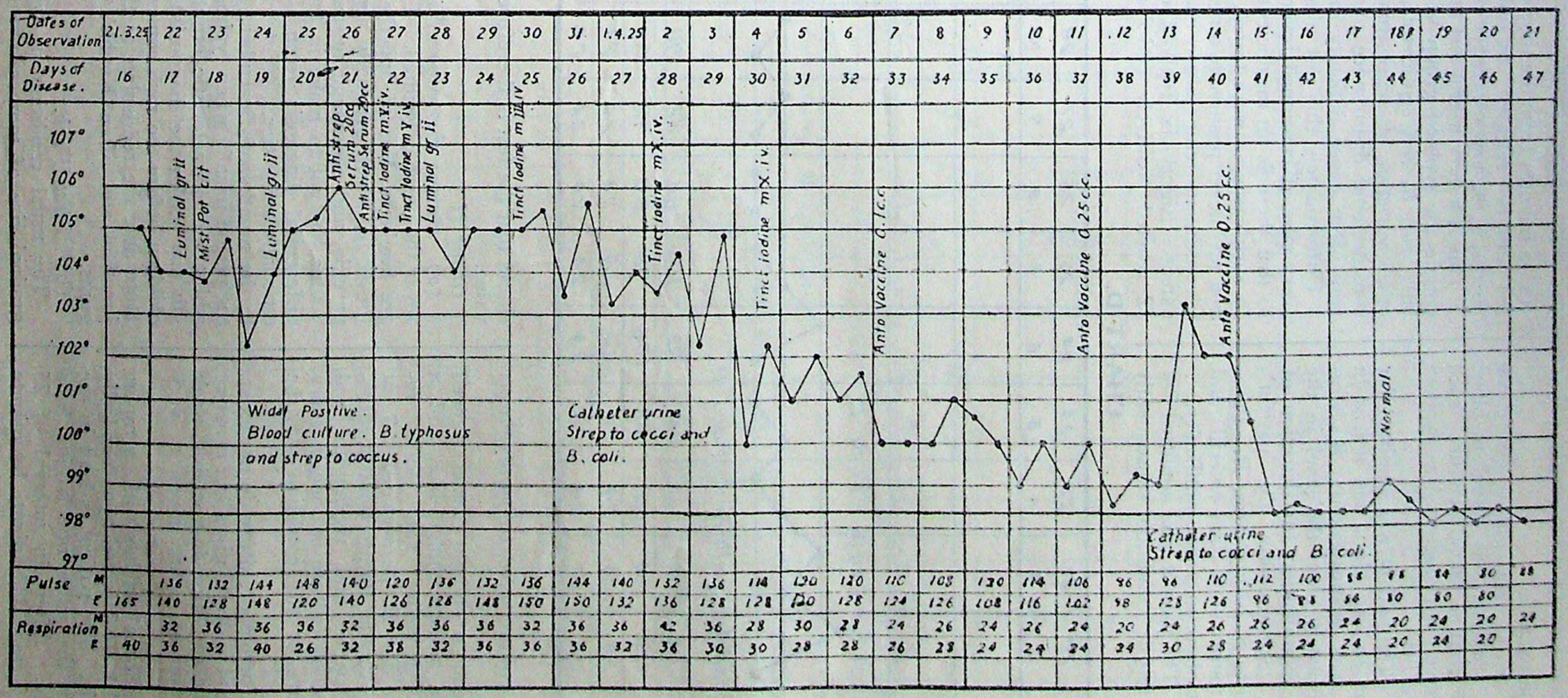
CHART A



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Group I. Some examples.

(a) *Charts B and C* shows only a low febrile condition, yet *B. typhosus* was found in blood culture. But for routine blood culture such cases would not have been diagnosed as typhoid fever.

(b) *Chart D.* The patient was admitted for dysentery and was *passing blood and mucus* in the stools: fever was inconspicuous. *B. paratyphosus B* was isolated from the stool in the course of routine examination for detection of dysentery bacilli. Subsequently the patient's serum agglutinated to *B. paratyphosus B.* Paratyphoid B causes more colitis than enteritis and so any case like the above may cause difficulty.

(c) *Chart E.* The patient was admitted for diarrhœa, and a febrile condition subsequently developed. Blood culture gave *B. paratyphosus A.*

(d) One patient, a Hindu male showed jaundice, diarrhœa, almost cholera-like, and a febrile condition, ill-defined. The Widal reaction was positive for *B. paratyphosus B.* at 1 : 100; and he recovered. Paratyphoid B. infection may cause hepatitis and cholangitis and so unless routine blood culture is done in every case the true nature of the condition may be easily missed.

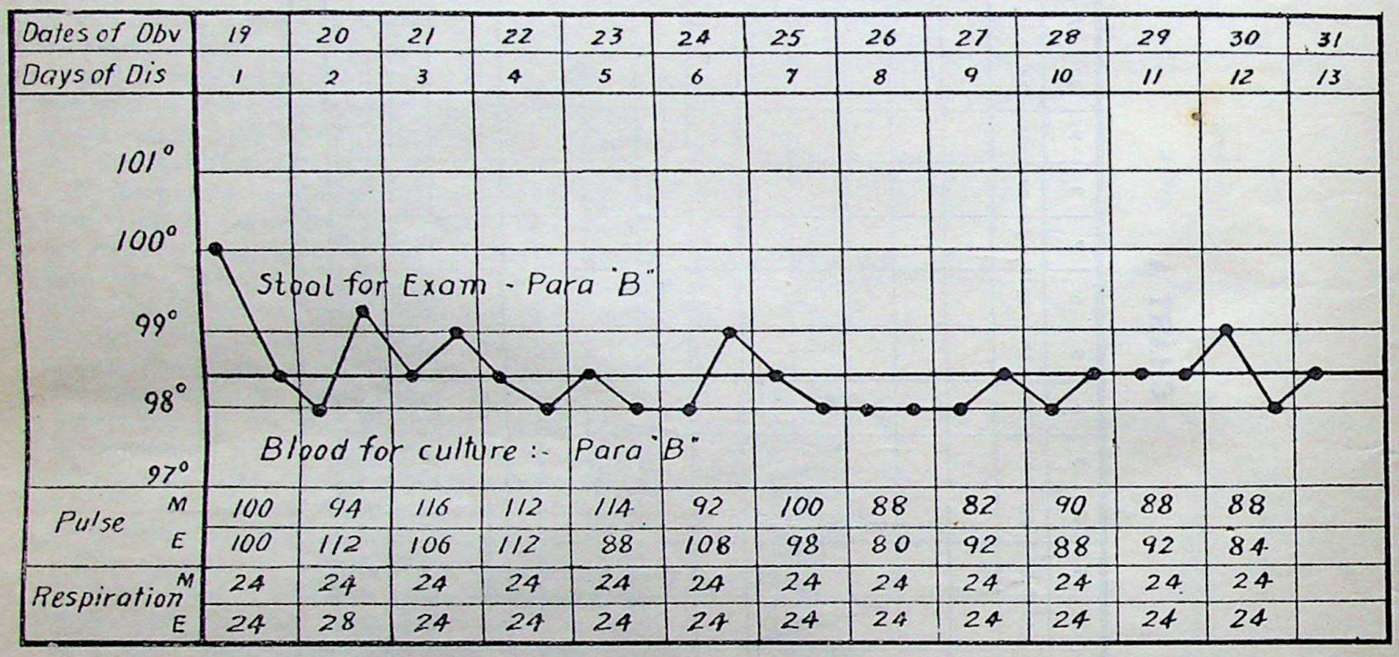
Where facilities for blood culture do not exist, or even where blood culture gives a negative result, the vagotonic condition in the first week of the typhoid group of fevers gives a very valuable test.

Marris's test. Three tablets of atropine (1/100th grain each) are injected hypodermically an hour after meals. The patient is kept in the recumbent position, the pulse rate having been recorded previously. After an interval of 25 minutes the pulse is recorded minute by minute for 45 minutes from the time of the injection. If the pulse is "released" by only 10 beats or thereabouts, it is very suggestive of typhoid infection.

This is a very useful test and will often differentiate the typhoid group of fevers from early kala-azar, *B. coli* septicæmia, streptococcal and other varieties of septicæmia, where profound constitutional disturbance and continued fever may often cause difficulty in diagnosis.

Unfortunately this test was not carried out in every case of continued fever that we met with, so that there is an insufficient series of controls. In such cases as were tested, however, the reaction was never positive in a non-typhoid case with a continuous temperature chart, to any definite extent. Eighty-six typhoid cases were tested; 72 reacted positively (83·7 per cent.), which shows that the test is therefore distinctly of some value.

CHART D.



Dates of Obv	19	20	21	22	23	24	25	26	27	28	29	30	31
Days of Dis	1	2	3	4	5	6	7	8	9	10	11	12	13
Pulse M	100	94	116	112	114	92	100	88	82	90	88	88	
Pulse E	100	112	106	112	88	108	98	80	92	88	92	84	
Respiration M	24	24	24	24	24	24	24	24	24	24	24	24	
Respiration E	24	28	24	24	24	24	24	24	24	24	24	24	

Group II

(a) *During the stage of invasion* in typhoid fever the onset is gradual. The chief symptoms are headache, loss of appetite, pains throughout the body, which gradually aggregate into actual pyrexia, and abdominal uneasiness.

One has got to make in the first few days a differential diagnosis from the eruptive fevers, especially *small-pox.* (*Note:* the latter is limited to the months of December, January, February, the period usually when typhoid incidence is low, whilst the characteristic eruption on the 3rd or 4th day settles the diagnosis). Also measles in children before the rash comes out is a difficulty. Here note the reddening of the face, nose, conjunctivæ and often Koplik's blue spots in the gums.

(b) *First Week.*

The usual condition in typhoid fever is a gradual rise of temperature (step-ladder rise);

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CHART B.

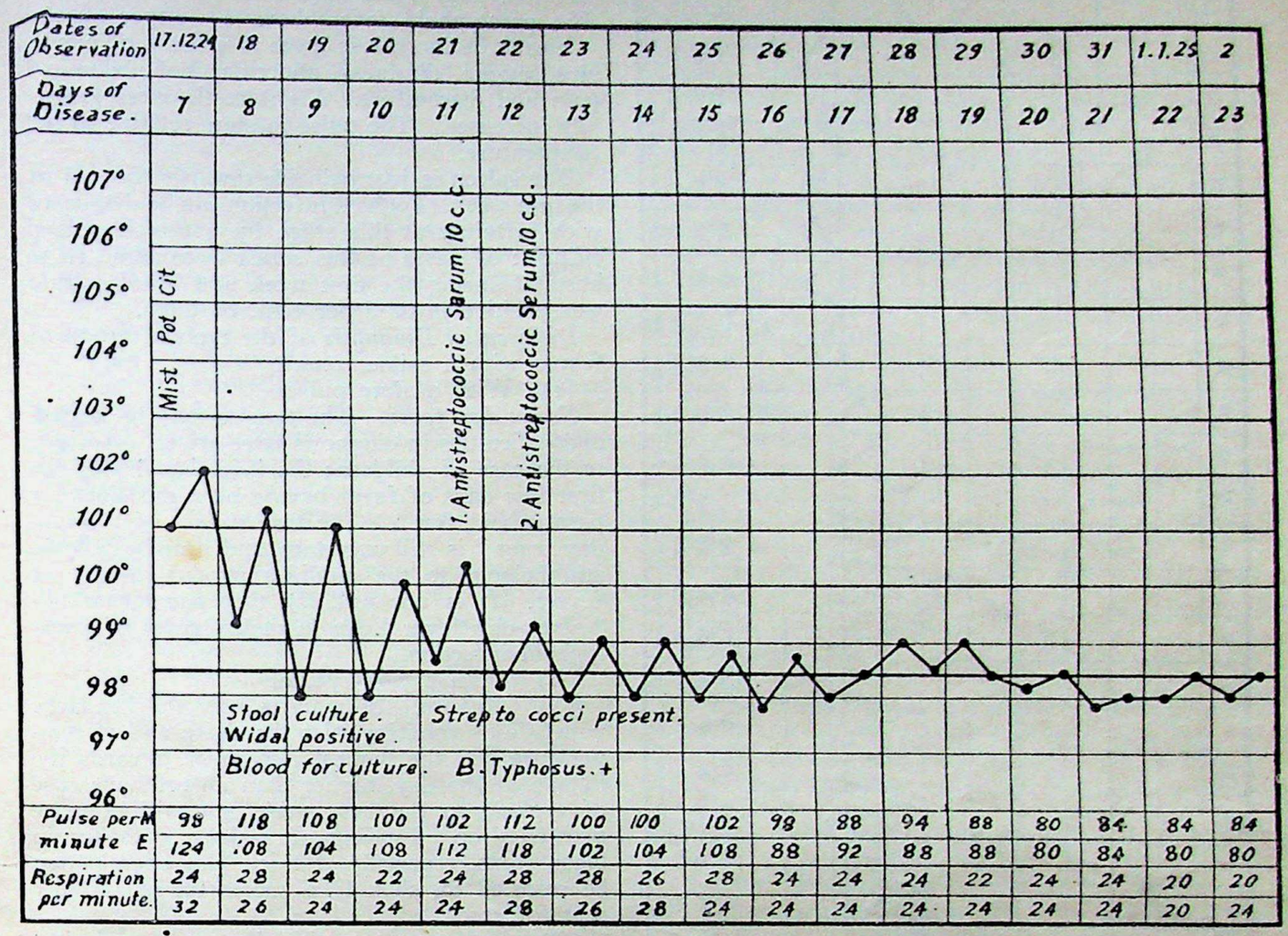

CHART C.

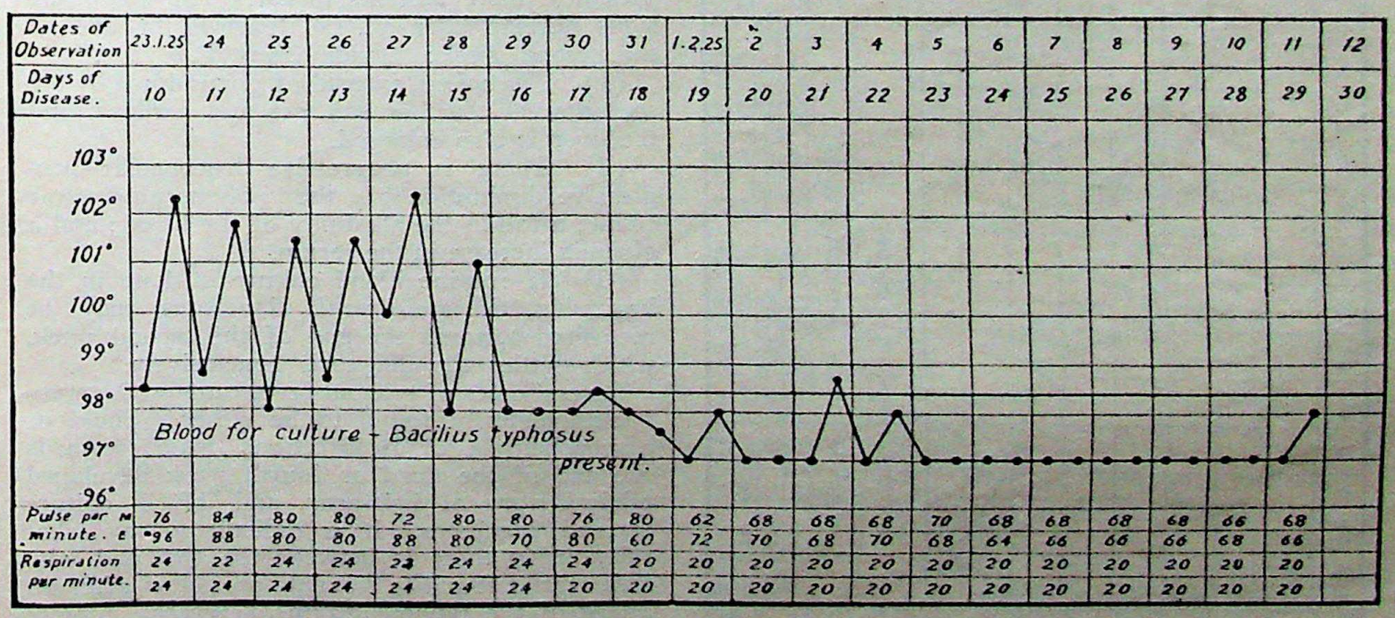

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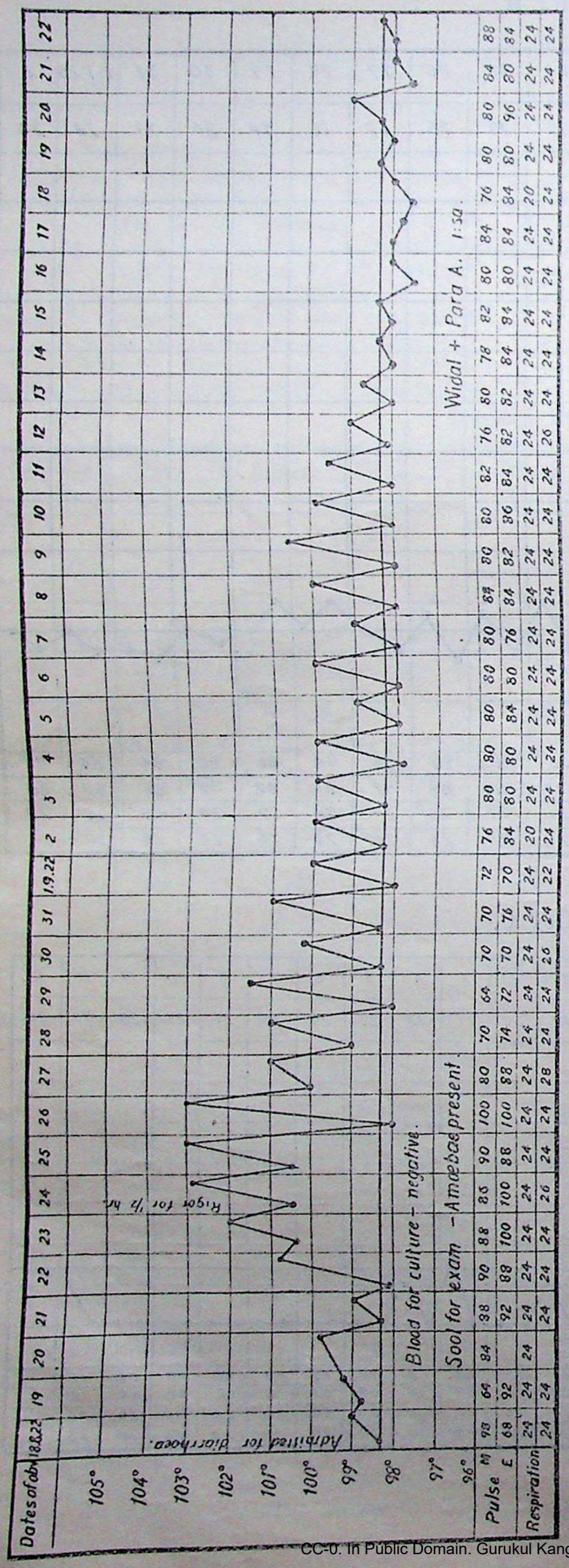
CHART E.



less commonly there may be a more sharp rise. The paratyphoid fevers have a sharper onset.

Headache increases: there is a sense of excessive fatigue, dizziness, anorexia, and abdominal pain and discomfort. Night restlessness gradually increases. The pulse is slow relative to the temperature.

The spleen is just palpable towards the end of the first week. Typhoid infection can be diagnosed with certainty at this stage by a positive blood culture: 67 cases of this series were admitted to hospital during the first week and blood culture was positive in 87·3 per cent. of them.

Differential Diagnosis of the typhoid group of fevers with a milder onset.

(i) With a *slow* pulse.

Seven-day fever.—The tongue may be coated, and difficulties in diagnosis have arisen, especially in the case of children; the infection during the first few days of fever having been mistaken for paratyphoid fever. The true nature of "seven day fever" is still uncertain, and it unfortunately still belongs to the undifferentiated group of fevers. It is not unlikely that some cases of "seven-day fever" are in reality cases of paratyphoid infection.

(ii) With a *quick* pulse.

(a) *Malaria.* In malaria note the headache with bilious vomiting, also the sharp rise of temperature and the highest rise more towards the middle of the day, higher than an ordinary case of typhoid in the first week and with a more marked drop. Finding of malaria parasites in blood films, especially if thick film examination be resorted to, should be successful in 100 per cent. of cases.

(b) *Kala-azar.* In this disease there is less toxæmia and less discomfort. The bowel symptoms are less, and instead of anorexia the patient is more anxious to eat. The diagnostic signs develop later on, i.e. towards the end of the second week: (vide chart F.)

(1) *The spleen,* instead of going down by the second week, further enlarges and hardens, and the liver is also enlarged.

(2) There is progressive leucopenia: progressive diminution of the polymorphonuclear count; a fall in the alkalinity of the blood; and a globulin increase in the serum.

(3) If routine blood culture is done in the beginning, the *Leishmania* flagellates may be recovered towards the end of the second week, which settles the diagnosis conclusively.

Several cases of typhoid fever came which were bacteriologically found to be either typhoid or paratyphoid A or B infections, which towards the end of the third or fourth week developed clinical signs of kala-azar, and blood culture showed flagellates. It is difficult to say what relationship there is between the two and why kala-azar is found to simulate or follow after an attack of the typhoid group of fevers. Simply lowered vitality will not account for it, as the same result is not so often observed after an

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attack of pneumonia or influenza, whooping cough, or measles.

Helminthic infections.

The patient, a boy of 9 years, came in with paratyphoid A infection and had perforation and was cured by operation.

Six days after his discharge from hospital he was re-admitted with the same type of continuous fever: the natural presumption was a relapse. All the laboratory findings proved negative. At last, towards the end of the second week santonin was given and as soon as several roundworms were passed, the temperature quickly came down to normal.

This case illustrates:

(1) Helminthiasis as an acute complication of enteric fever.

(2) The existence of a febrile condition simulating typhoid fever, but due to *Ascaris* infection.

(3) The fact that apparent *relapses* are often *complications.*

This is especially important with reference to children. Another patient, a boy of five, was running a continuous fever, comatose, but with a high temperature and a relatively quick pulse; it was thought that the case might not be one of enteric fever, but of malaria or of *Ascaris* infection. Santonin was administered, several roundworms were passed, the fever quickly disappeared, and he made an uninterrupted recovery.

(III) *Bacillary Dysentery.*—A patient who is passing blood and mucus, with a temperature of from 101°F. to 102°F, may be suffering from paratyphoid B infection. Such cases should not be mistaken for bacillary dysentery. The differential points are: (*a*) That paratyphoid B ulcerations are in the upper part of the colon, whereas bacillary dysentery tends more to affect the lower part of the colon. (*b*) In typhoid tenderness tends to be more marked over the cæcal region than over the sigmoid colon, whilst there is more peri-umbilical tenderness, and no tenesmus. (*c*) Blood culture and culture of the stools, or the agglutination test will give a positive diagnosis.

(IV) *Appendicitis*, especially in children, may simulate typhoid fever. In typhoid, and especially paratyphoid fevers, cæcal tenderness may be marked, and especially if the constitutional symptoms are not marked such cases of appendicitis may simulate the enteric group of fevers. One patient, admitted to hospital with a high temperature and marked pain in the right iliac fossa, was subsequently proved to be a case of paratyphoid B infection by bacteriological tests. In true appendicitis the local signs are more marked, whilst leucocytosis is a valuable differential point, and blood culture or the agglutination test may afford positive evidence. In the enteric fevers one gets a tumid abdomen which differs from the rigidity of the muscles of the abdominal wall in appendicitis.

Fever with severe onset.—Here the enteric group of fevers have to be differentiated from:

(*I*) *Cerebro-spinal* meningitis.—Some cases of typhoid fever with very severe nervous symptoms may closely simulate cerebro-spinal meningitis. In both fevers the pulse tends to be slow in relation to the temperature chart, and in both diseases there may be violent delirium, rigidity of the neck, and a positive Kernig's sign in the first few days of fever. In typhoid meningitis three conditions may be present:

(a) The commonest is "meningism:" this is seldom absent, especially during the second week in all severe cases of typhoid infection: it amounts to varying grades of meningeal irritation, but with no exudation.

(b) Serous meningitis. This is less common than meningism. In 9·6 per cent. of all the cases under report in this paper was there necessity for lumbar puncture, where serous fluid was withdrawn. In all such cases the aspirated fluid was sterile on culture, and the serous exudate was due to irritation by the typhoid toxin, not to infection of the cerebro-spinal fluid.

(c) Purulent meningitis. This is extremely uncommon in typhoid fever. In one case, a Jewish child of six years of age, milky fluid was withdrawn, and on culture gave a growth of *B. paratyphosus B.*

Important differential points with regard to cerebro-spinal meningitis therefore are that in this disease (*a*), the cerebro-spinal fluid is turbid, and on examination of either smears or cultures will show meningococci; whilst (*b*), cerebro-spinal meningitis is usually associated with a marked leucocytosis.

(*II*) *Malaria.*

In malaria the first two days of fever may be of mild type, and in malignant tertian infections pernicious symptoms may not set in until the third day, when we may encounter delirium, coma, meningeal symptoms, and even symptoms suggestive of hemiplegia and paraplegia—though such latter conditions are rare. The temperature chart may show a gradual rise; malignant tertian malaria is especially common during the autumn, a season of the year when typhoid fever is also common; whilst in both diseases there may be enlargement of the spleen. In differentiating the two diseases, the following points may be of importance:

(*a*) A quick pulse is a practically infallible sign of cerebral malaria, as distinguished from the slow pulse of typhoid fever or cerebro-spinal meningitis.

(*b*) In malaria the conjunctivæ usually show a faint icteroid tinge which is not present in cases of typhoid fever.

(*c*) Examination of blood films will almost invariably show the presence of malaria parasites in cases of malignant tertian malaria; (although in a very few exceptional cases the symptoms all point to malaria, but examination of blood films gives negative results.)

(*d*) Vomiting of bilious type is usual in malignant tertian malaria, but is very rare in typhoid fever.

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(*III*) *Influenza and Broncho-Pneumonia.* In most cases of typhoid fever there is a certain amount of bronchitis during the first week of fever, due to the spraying of typhoid bacilli—released from their first habitat in the Peyer's patches—into the systemic circulation; but this gradually disappears during the second week. In some cases however the inflammatory process may extend into the smallest bronchioles and into the peri-bronchial tissue and produce multiple small foci of consolidation: these may be so marked that the symptoms of typhoid may be entirely masked, and this may cause considerable difficulties in diagnosis.

An ordinary case of broncho-pneumonia hardly causes so much constitutional disturbance as is associated with the broncho-pneumonia of typhoid fever.

During an epidemic of influenza, greater difficulties arise. Such epidemic influenzal cases may even show grave constitutional disturbance, pulmonary and intestinal symptoms, leucopænia, even a comparatively slow pulse; (e.g. *vide* Chart K). The bacteriological findings in this case were negative for the enteric group of fevers, but a positive blood culture for the influenza bacillus was obtained.

Helpful points in differentiation in such cases are: (*a*) Marris' test for vagotonia in the typhoid group of fevers: (*b*) the results of cultural tests on the blood and sputum; and (*c*) the subsequent course of the disease.

In one patient, an Anglo-Indian male, presenting such features *B. paratyphosus A* was isolated from the sputum. In a few cases of broncho-pneumonia simulating typhoid, cultures have been taken for the enteric group of organisms, and it is likely that such a procedure might give valuable information in difficult cases.

(IV) *Septicæmias.*

(A) *B. coli infection.* In this the temperature rises more abruptly than in typhoid fever, and though the fever is continuous the temperature chart shows much more marked up and down rises, frequently associated with rigors, discomfort in micturition, and many pus cells in the urine, which is markedly acid in reaction. The pulse is quick, and there may be renal tenderness. (*vide* Chart L).

(B) *Streptococcal septicæmia.* Such a case with a continued high temperature, profound toxæmia, also if associated with bowel symptoms, may closely simulate a severe case of typhoid fever. Diagnostic signs are:

(*a*) a quick pulse.

(*b*) the existence of septic foci, if any can be found.

(*c*) a blood culture which yields the streptococcus.

(C) *Pneumococcal septicæmia.* It is important to note that pneumococcus infection may cause—though only very rarely—general septicæmia without much localising signs in the lungs. Chart M, for example, is that of a patient who showed only a transient bronchitis, with a continued fever very much resembling typhoid fever. The diagnostic signs are similar to those of a streptococcal septicæmia.

(V) *Syphilis.*—In rare cases of syphilis the fever that precedes the secondary rash may be so severe that it may simulate typhoid fever in the first week, until the diagnostic rash appears. (Anything resembling the syphilitic rash is very uncommon in the typhoid group of fevers).

(VI) *Early tuberculosis.* This is not very commonly seen in hospital, as the majority of cases come under observation at a late stage. It is frequent enough however to constitute a source of difficulty. The lung condition shows sibilant râles in patches over the lungs. Dr. Pelle in the *Annales de Medicine* for 1924 records 14 cases of such type. Differential points are (*a*) Marked vagotonia, with a positive Marris' test in typhoid. (*b*) Isolation of one of the typhoid group of organisms from the blood, or less commonly from the stool, urine, or even sputum.

It is important to make an accurate diagnosis on account of the question of diet, for if the case is one of tuberculosis, diet should not be restricted. Genital tuberculosis in girls of an early age is often mistaken for typhoid fever.

The Diagnosis of the Typhoid Group of Fevers by Laboratory Methods.

It is to be insisted on that in all cases of continued fever showing no definite diagnostic symptoms or signs, the possibility of the typhoid group of fevers should be thought of, and every attempt made to establish the diagnosis by laboratory examinations.

Blood Culture.—Where facilities exist for it, the earliest and most satisfactory method of positive diagnosis of typhoid fevers is by blood culture, and this should be done as a routine test; during the first week of the fever this test seldom fails, and the medical attendant is at once put on the right track.

The clinical signs of the typhoid group of fevers, though by themselves fairly distinctive, should always be checked by laboratory tests; only in this way can the mind of the observer be trained in accurate thinking and diagnosis, and no opportunity for such training should be lost.

Widal Reaction.—In an ordinary case the Widal reaction becomes positive in the beginning of the second week of fever, but in some cases it is delayed till the third week. When a positive reaction is obtained (in an uninoculated person) however its diagnostic value is very great. We accept as positive standards an agglutination at 1:80 for *B. typhosus.* 1:20 for *B. paratyphosus A;* an organism which agglutinates with some difficulty. 1 : 1000 for *B. paratyphosus B;* an organism which is easily agglutinable.

Difficulties may arise with regard to the Widal reaction.

(1) In inoculated persons, who are mostly Europeans. Such patients however will give a history of having been inoculated within the previous two years; whilst when enteric fever is

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CHART F.

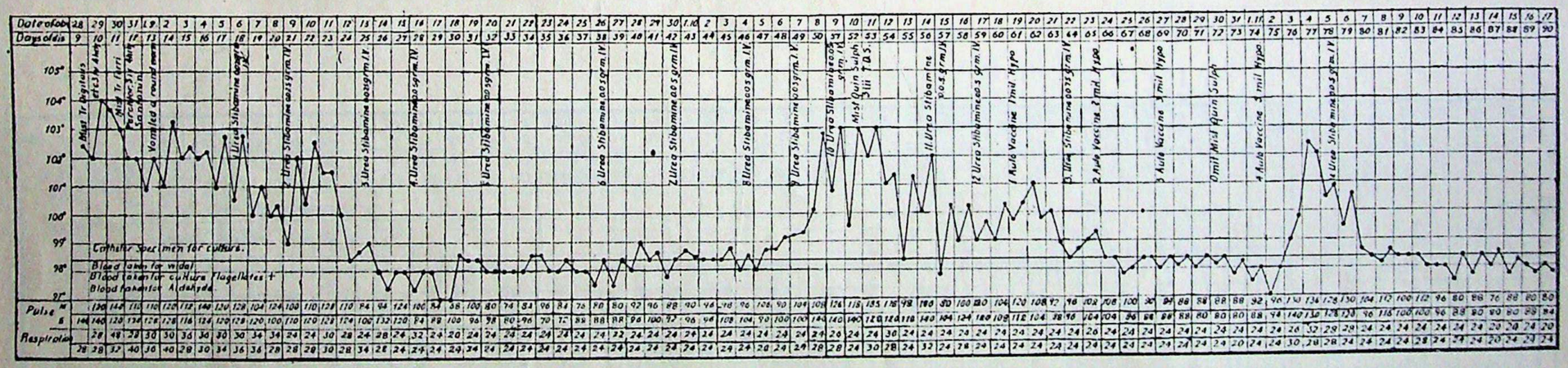

CHART G.

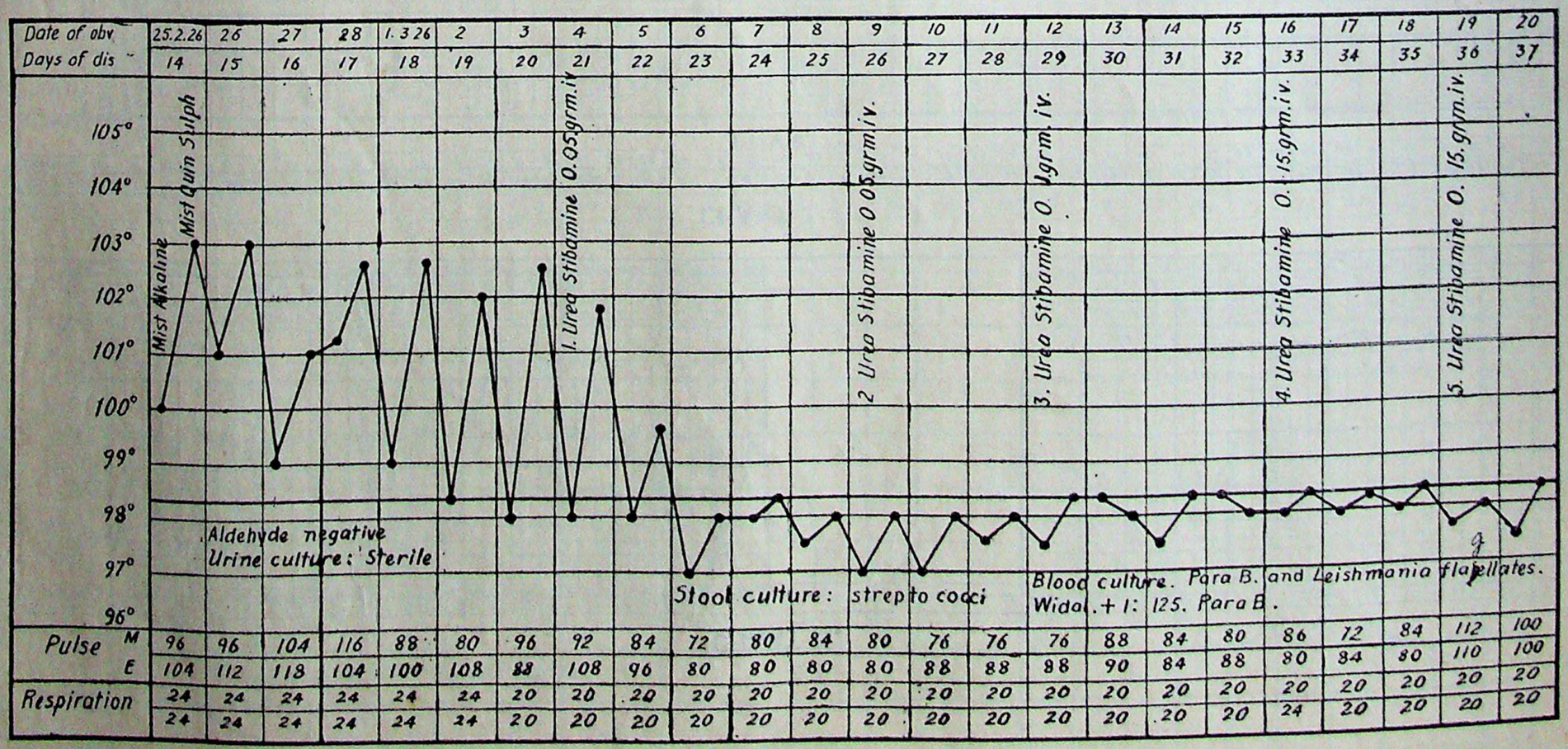

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CHART H.

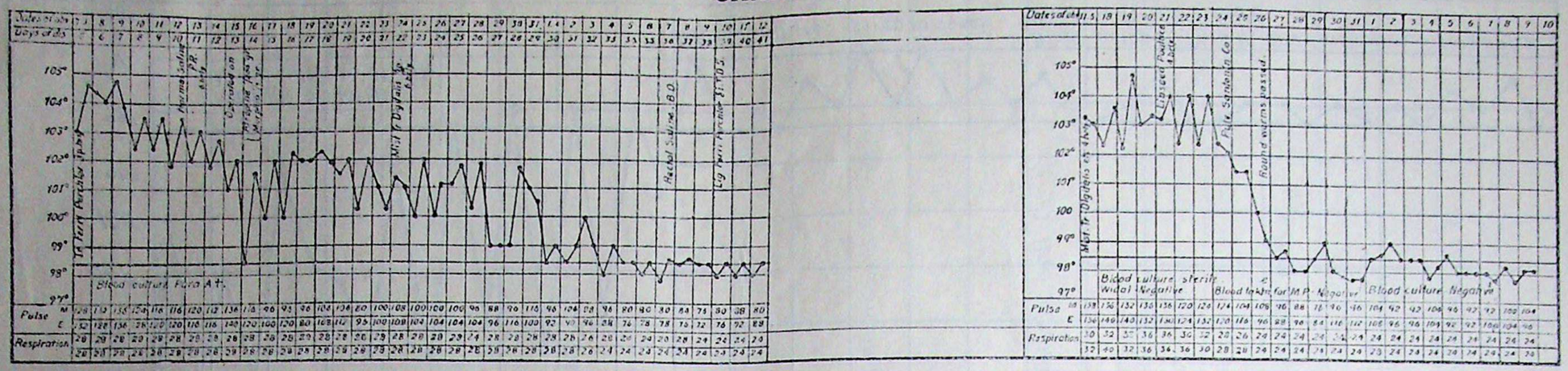
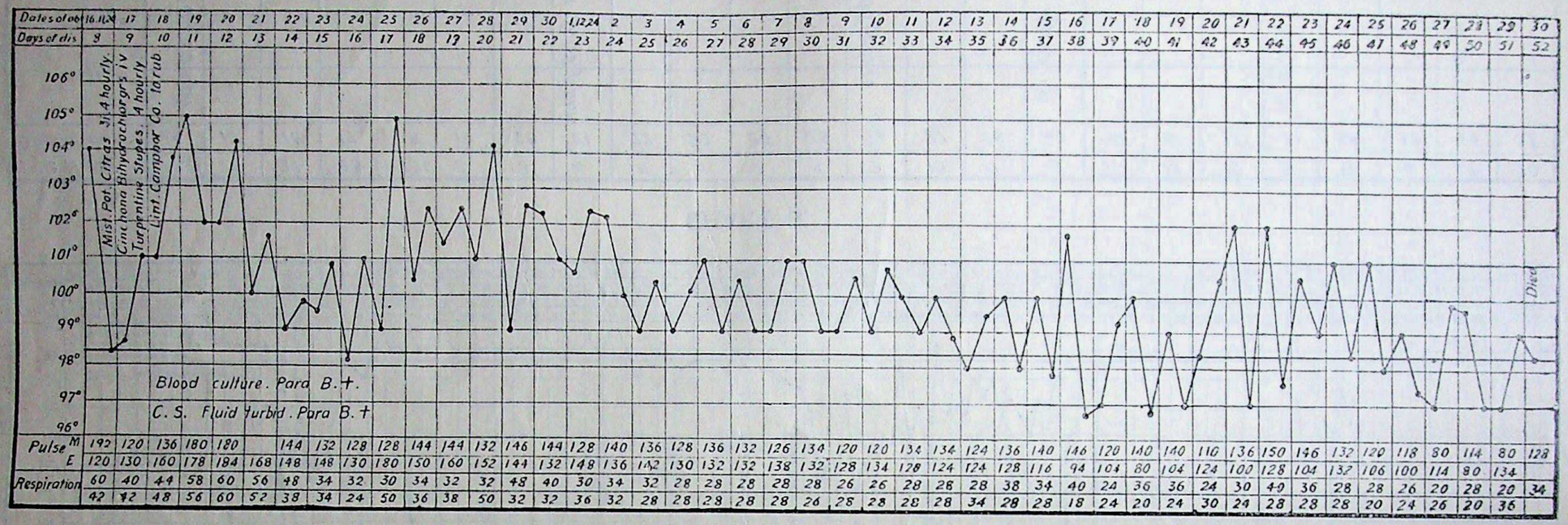


CHART J.



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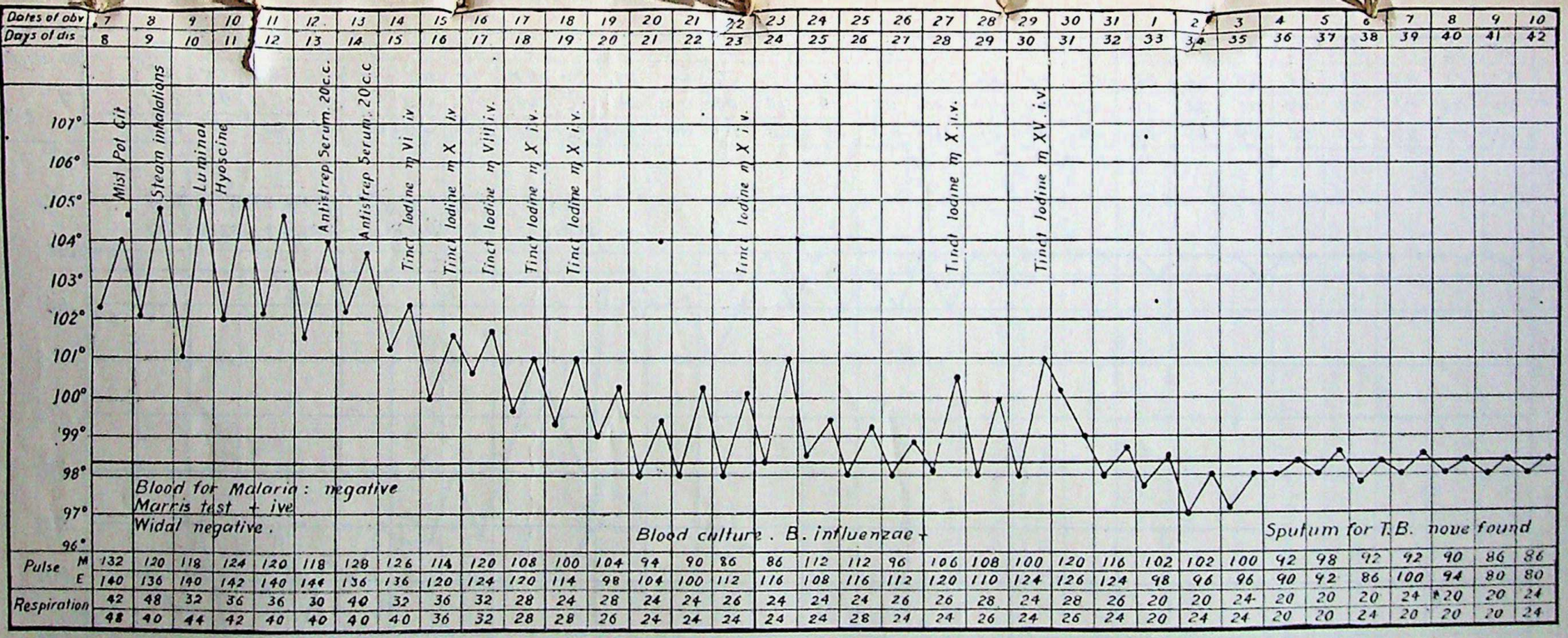
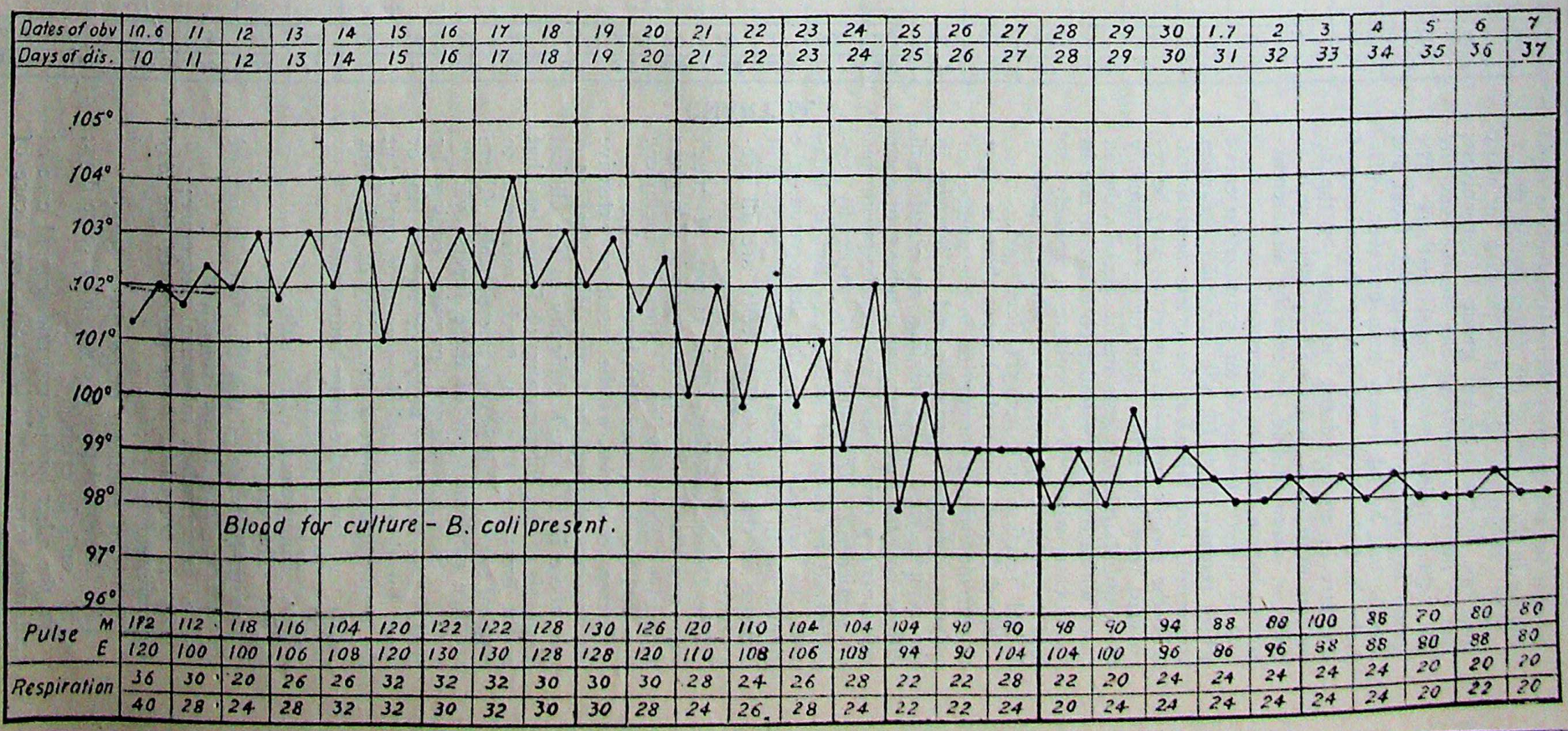


CHART L.



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present in such persons there is usually a rapid change in the curve of the agglutination titre.

(2) When the reaction is positive for more than one of the *typhosus* group of organisms; one of the reactions being the specific one, and the others being group agglutinations. The group agglutinins can be separated from the specific one by laboratory tests however. (Dr. Lohr in 1924 drew attention to the raising of the titre in an inoculated individual by the injection even of a non-specific protein such as milk or serum protein, or even by an intercurrent infection, such as influenza).

A diagnostic feature is an agglutination curve which remains high for the particular organism concerned, but falls for the group agglutinins. Also the specific organism concerned may be recovered from the urine, stool, or less commonly the sputum, and such tests are of special value in cases which have come under observation late in the disease, where blood culture is unlikely to lead to positive findings, and where a positive Widal reaction has not yet developed.

Blood Count.—In typhoid fever there is slight leucopænia, with a diminution in the number of polymorphonuclear leucocytes and an increase in the lymphocytes. This finding in itself will differentiate the fever from any condition of acute inflammatory origin, such as broncho-pneumonia or septicæmia. Difficulties are especially encountered in cases of kala-azar. But in kala-azar, as already noted, the leucopænia, the diminution in the polymorphonuclear count and increase in the mononuclear cells, are all progressive.

The Diazo Reaction.—This is not of much value as a diagnostic test, since malaria also gives a positive diazo reaction. Russo's methylene blue test has been used with better results.

Garrow concludes, as the result of extensive observations during the Great War, that as a rule there is not much difficulty in the clinical diagnosis of the enteric group of fevers, but that in the literature there is much reference to atypical types. This is very questionable. There are five cardinal signs of these fevers; viz.

(1) Slow, continued pyrexia, ending by lysis. The fever may be low or high, of long or short duration, the remissions great or small; but the temperature chart is invariably of this type.

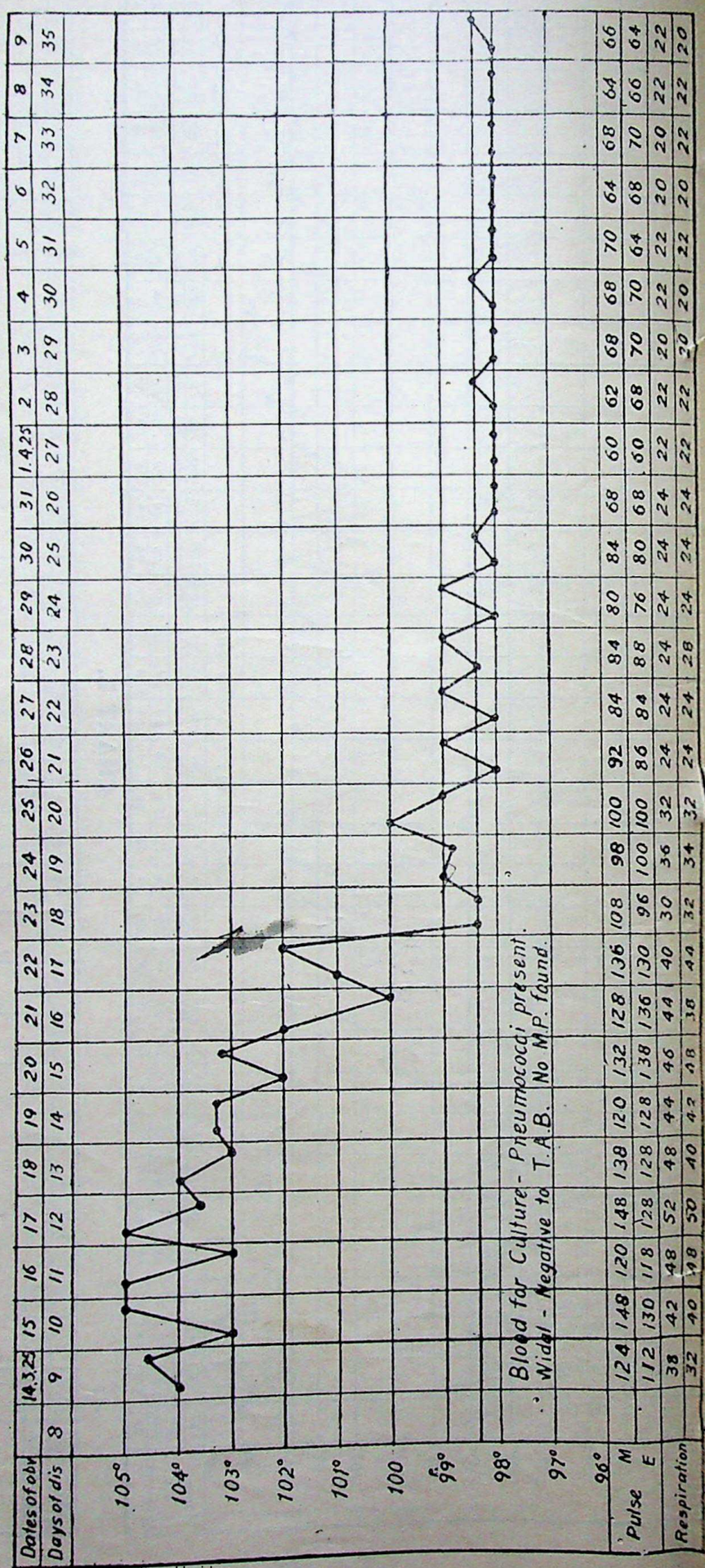
(2) A low pulse-temperature ratio.
(3) Typhoid toxæmia.
(4) Enlargement of the spleen.
(5) The eruption of rose spots.

Manson-Bahr states that the fever is not of the enteric group if the temperature

(1) is normal or subnormal altogether;
(2) is normal at some period of the day (intermittent fever);
(3) is of remittent or quotidian type;
(4) shows relapses every two or three days;
(5) ends by crisis.

On the other hand every undiagnosed case of continued fever should be treated as a case of

CHART M.



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enteric until the diagnosis is made. It is only by comprehensive laboratory tests, and sustained and accurate clinical observation that the true diagnosis in many of the puzzling cases of pyrexia of uncertain origin in tropical medical practice can be made.

Summary.

(1) It is not always easy to diagnose the typhoid group of fevers, especially during the first week of illness.

(2) It is very important to establish the true diagnosis during the first week, however, in view of proper treatment and the taking of prophylactic measures.

(3) True relapses are uncommon in the typhoid fevers, but a relapse due to a secondary complication is much more common.

(4) Of all diagnostic procedures during the first week of illness, none is more reliable than blood culture.

(5) The possibility of cases of pyrexia of uncertain origin being anomalous cases of the enteric group of fevers should always be borne in mind.

In conclusion, I wish to acknowledge my indebtedness for the collection of information and records to Dr. A. R. Mozumdar, Registrar of Cases, Medical College Hospital, Calcutta, who is at present conducting an elaborate investigation into the whole question of the prevalence, diagnosis and treatment of cases of the enteric group of fevers at the Medical College Hospital.

* * * * * *

In the discussion on Colonel Barnardo's paper, Major R. Knowles, I.M.S., said that he had long regarded typhoid fever and other debilitating causes as of fundamental importance in the pathogenesis of kala-azar. During recent years case after case had been admitted to the Carmichael Hospital for Tropical Diseases in Calcutta suffering from typhoid fever, proved to be such either by a positive blood culture, or a strongly positive Widal reaction; had recovered, and had then "relapsed," when blood cultures had shown the presence of *Leishmania donovani*. The frequency with which this happened could not be explained by coincidence.

The gut was a most important source of focal sepsis in tropical medical work. The many conditions, such as typhoid fever, which are associated with ulceration of the gut not infrequently may lead to invasion of the blood stream with streptococci or other organisms derived from the intestine. Attention at Home was focussed on dental sepsis as a source of systemic disease; in the tropics minimal ulceration of the gut might be equally important. He was glad that Colonel Barnardo, as a clinician, had paid a tribute to the laboratory worker; in return, he would urge the laboratory worker not to neglect the clinical aspect of the study of tropical diseases; the pathologist could never replace the clinician; both should work in harmony. Colonel Barnardo had emphasised the Dreyer technique. He knew that some pathologists regarded the Dreyer technique as being *too* delicate; he did not; he regarded it as far and away the best method of carrying out the Widal reaction. In inoculated persons a weekly test by the Dreyer technique would soon show whether the patient was suffering from enteric fever or not.

"Tick typhus" was a puzzling entity—if it could be called an entity—in tropical medicine; for such patients occasionally gave a positive Widal reaction. "Rose spots" were not of much value in diagnosis in the tropics for prickly heat was a constant source of confusion. Colonel Barnardo had mentioned dysenteric symptoms as occurring in typhoid fever; had he fully considered the possibility of mixed infections? The latency of *B. typhosus* infection was sometimes remarkable; he would remind those present of Colonel Cornwall's remarkable rabbit, which received an intravenous injection of *B. typhosus*, remained in good health, was killed two years later, and then yielded a pure culture of *B. typhosus* from its gall-bladder. In differentiating malaria from typhoid the use of the thick blood film was invaluable, especially in those cases of *P. falciparum* infection where parasites were very difficult to detect in thin films.

Dr. Ganapati Panja said that the state of the tongue was often atypical in enteric infections. Quinine administration was often useful in differentiating enteric fever from malaria. The spleen was but rarely palpable during the first week of an enteric infection. The Widal reaction was often misleading: he had seen cases with a quick pulse, a positive Widal reaction, and *Leishmania* cultivated from the peripheral blood. Infantile cirrhosis and early hepatic abscess were conditions which had to be differentiated from the enteric fevers. Ascaris infection might also simulate typhoid fever.

Dr. U. P. Basu said that the Widal reaction was not of much value in inoculated persons; also the clinician could not afford to wait until it had become positive. Blood cultures were difficult in private practice; whereas stool culture could almost always be obtained, and afforded valuable results. He had seen cases of enteric fever—especially in Indians—with an abrupt onset. Epistaxis was of value as an early diagnostic symptom; the rash was unreliable, though in Marwaris he had noted the frequency of sudamina—in fact it was so common that the sudamina of typhoid fever had received a special Marwari name, *moticharra*. In a pneumonia patient with a temperature of 103°F. the skin was burning hot; in a typhoid patient with a similar temperature it was cool. Marris' test was not of much value before the 8th day of the disease.

Dr. M. N. Bannerji, speaking as a practitioner of more than forty years standing in Calcutta, said that it was curious to trace the development of our knowledge of typhoid fever in Calcutta. At first one heard a lot about "typho-malaria." Then the kavirajs talked of a "41 day fever." Then, when typhoid fever was first differentiated, its frequency in Calcutta was ascribed to the introduction of an underground conservancy and drainage system. Most cases of fever of three to six weeks duration in Calcutta were cases of typhoid fever, not of kala-azar. The clinician could usually easily establish the diagnosis of typhoid fever after the seventh day of illness, but diagnosis during the first week was often difficult. He had not much use for the laboratory specialist; he had known two laboratory specialists called in to the same patient, one in the evening, one the next morning; both had taken blood cultures; one had reported *B. typhosus* present, the other a negative finding. Observation and experience could not be neglected; but the text-book charts of enteric fever did not always hold good; ending of the fever by lysis was far more typical than its onset with a step-ladder temperature chart. The pulse was not always slow; it might reach 100 to 120 during the second week. The evening temperature might be lower than the morning one.

Colonel Barnardo, in replying, said that the state of the tongue was not always typical. Early epistaxis certainly was an important diagnostic point; also especially the early headache. Fayrer in his Croonian lectures for 1882 had quoted from the *Indian Medical Gazette* for 1879 as to the value of quinine administration in differentiating malaria from typhoid fever. The spleen in the first week of enteric fever is usually *just* palpable, and tender. The Widal reaction was only of value if positive, but the Dreyer technique was extraordinarily accurate and gave dependable results. Stool culture was a routine test at the Medical College Hospital, but had occasionally given positive results in a typhoid carrier who was suffering from some other fever. In the case of one child, urinary culture had given *B. typhosus* as late as the 40th day of fever. Indians were so accustomed to "fever" that one only rarely saw the step-

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admitted after the fever was well established. With regard to the pulse-temperature ratio, he would give the following figures:

Temperature.	Typhoid fever.	Non-typhoid fever.
104°F.	.. 115	.. 130
103°F.	.. 108	.. 120
102°F.	.. 100	.. 115

Whilst in pure typhoid infection the pulse was never above 115 (except in hæmorrhage, or in secondary streptococcal invasion of the blood stream).

Current Topics.

The Far Eastern Association of Tropical Medicine.

WE would like again to remind our readers that the Seventh Biennial Congress of the Far Eastern Association of Tropical Medicine will be held in Calcutta from December 5th to December 10th, 1927. The Congress is being held in India on the special invitation of the Government of India, and, so far as we know it will be the first truly international congress of any sort to be held in this country.

Since its first inception in 1910, the Far Eastern Association of Tropical Medicine has steadily grown in importance. At the Sixth Congress, held at Tokyo in 1925, there were present official delegates from Australia, British North Borneo, China, Cuba, the Federated Malay States, Formosa, Hongkong, India, Indo-China, Japan, Macao, the Netherlands Indies, the Philippine Islands, Shanghai, Sarawak, Siam, the Straits Settlements, and the United States of America. The Government of India have invited these countries and also the Local Governments in this country and Indian States to send official delegates to the coming Congress. His Excellency the Viceroy has consented to be Patron of the Seventh Congress, and Major-General T. H. Symons, C.S.I., O.B.E., K.H.S., I.M.S., Director-General, I.M.S., is to preside.

This is the first occasion upon which the medical profession in India has had the opportunity of reaching what one may term international status, and it is "up to" every branch of the medical profession in this country, Indian and European, official and non-official, to do its utmost to make the Congress a success. There are three main duties imposed on the medical profession in this country.

The first is to join the Congress as full members or as associate members. In our issue for last May perhaps we did not quite correctly express the difference between full members and associate members. Ordinary membership is open to all medical, dental, and veterinary practitioners whose degrees are officially recognised by their home Governments (in the case of this country, degrees recognised by the General Medical Council in Great Britain), and scientists working in the sphere of medicine and hygiene. Full members may attend the Congress, contribute scientific papers and join in the discussions. They may also attend and register their votes at business meetings and are entitled to the official *Transactions* of the Congress. The fee for ordinary full membership is Rs. 26-10-0 (i.e., £2).

Associate membership, for which the fee is Rs 5, is open to all whose degrees are not recognised by the General Medical Council in Great Britain. As far as the scientific part of the Congress is concerned associate members have the same privileges as ordinary members, except that they do not obtain a free copy of the *Transactions*. Thus they may attend the Congress, contribute scientific papers, and join in the discussions. They have no voice in the management of the affairs of the Association, however, and therefore cannot attend any business meetings. The success of previous Congresses has been due in great part to the number of members enrolled in the country in which the Congress is held, and it is hoped that the medical, dental, and veterinary professions in India will enrol themselves as members and associate members in large numbers and thus secure a Congress worthy of the Indian Empire.

The second duty of the medical profession in India is to submit scientific papers to be read at the Congress. We cannot hope to rival the unbounded hospitality showered on the delegates attending the Sixth Congress in 1925 by Japan, but we do not think that the standard of the papers to be submitted will fail to be a high one.

The Congress is not intended for scientific research workers only, but for the whole medical profession. Thus the scope of subjects upon which scientific papers are invited is very wide and covers the whole range of medicine, surgery, pathology, bacteriology, ophthalmology, midwifery, psychiatry, physiotherapeutics, public health in all its various activities, dentistry, and veterinary science. Much of the most valuable literature in tropical medicine has been written by men who had the spirit of research, though they were not specifically employed on investigation. Sir Patrick Manson himself carried out his famous researches into filariasis whilst on general duty in China. We would make a special appeal to Indian medical men to give of their very best to the Congress; also to the private European practitioners in this country, many of whom are in a position to send in valuable clinical records. Papers should be so short that they do not take more than 20 minutes to read, and are best illustrated by lantern slides. Authors whose papers are accepted will receive 30 reprints free of charge, and can obtain further copies at cost price, if they ask for such further copies at the time of sending in the abstracts of their papers.

The general organising Secretary to the Congress is Lieut. Col. J. Cunningham, I.M.S., Pasteur Institute of India, Kasauli; whilst the local secretary for Calcutta is Lieut. Col. A. D. Stewart, I.M.S., Calcutta School of Tropical Medicine and Hygiene. Applications for

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memberhip should be addressed to the former. Further, medical institutions in India may become members, and have power to nominate an individual as their representative. With regard to papers, members intending to present papers should send in the title of their paper to Colonel Cunningham immediately, stating at the time whether they will require lantern facilities or space in the Exhibition for demonstration specimens, and whether the author will read the paper himself, or whether he is desirous of having it read on his behalf. This should be followed by a typewritten abstract, not exceeding 1,000 words, which should be in Colonel Cunningham's hands *not later than July* 21*st* 1927. No abstract received later than that date can be printed or circulated. The complete paper should reach the General Organising Secretary not later than October 10th, 1927. All scientific papers before final acceptance will be scrutinized by the scientific sub-committee.

The Congress in Calcutta will be held in the grounds and buildings of the Calcutta Medical College and of the Calcutta School of Tropical Medicine and Hygiene, and arrangements are well forward for an exhibition section. This will consist of two parts; a medical, dental, and veterinary professional section; and a commercial section for chemists, manufacturers, etc. Communications in connection with this should be addressed to Colonel Stewart. In connection with the professional part of the exhibition, as far as possible arrangements are being made to collect exhibits dealing with the different important tropical diseases each in turn, and in groups. Arrangements are in the hands of an Exhibition Committee in Calcutta, and it is hoped in this way to avoid overlapping and duplication. The amount of space is limited, and intending exhibitors should note this fact. A small clearly arranged exhibit is far more interesting than a badly organised one, covering and wasting much space.

Still a third duty which devolves on the medical profession in this country in connection with the Congress is to play the rôle of host during the tour of the various important cities and medical institutions of India, which will follow the General Congress, and will last from December 11th to December 22nd. Here we are certain that the delegates from other countries will have much that is of interest to see in India; and we appeal to the medical profession in India to make their tour an interesting one, and to make their visit both pleasant and profitable. If the medical profession in this country is going to adopt the unfortunate attitude that scientific work is the business only of the specially appointed research worker, our visitors will form an unfavourable impression of the vitality of medical science in India. The plea that we have no opportunities for research work will not be received sympathetically, for our visitors will know very well that every medical man in this country has scope for the study of the diseases which he meets with in his everyday practice. There is no law which prohibits anyone from observing and recording his experiences, and it is a matter of common knowledge that opportunities are rather made by the worker than thrust upon him from outside.

It is not likely that another international medical congress will be held in India for another fifteen years or more, and few of us would be prepared to wait so long if it were a question of proving our fitness for a post, instead of maintaining the credit of our country. The good name of India is at stake in this Congress; our visitors will be friendly, but they will be well informed; we have ourselves invited them to come and see the general trend of medical, surgical, and public health work in this country; and we must bestir ourselves to do our best. An adverse or critical report by the delegates of other countries would damage not merely the reputation of the medical profession in India; it would extend to the fitness of India in general to take her place amongst the progressive nations of the world.

Hitherto, despite the many and notable contributions made by India to the advancement of tropical medicine, there has not been sufficient publicity given to Indian work. Until recently the outside knowledge of the work done in India has been very imperfect; though the wise policy of the Imperial Government in delegating the Public Health Commissioner with the Government of India to attend one of the two meetings in each year of the Office International d'Hygiene Publique in Paris has aroused renewed interest in work going on in India. The work of our leading scientific research workers, both Indian and European, is fairly well known to workers in other countries. What they do not know and what the Congress will afford them a means of getting to know, is the continuous and steady progress made in all branches of tropical medicine and surgery and public health, year in year out, in India by the small army of the medical profession in this country, both non-official as well as official.

In brief, we cannot but once again urge upon our readers that the Congress to be held next December will afford a real test of where the India of to-day stands in the sphere of tropical medicine.

The Indian Science Congress, 1928.

As we explained in our issue for last May, a difficult position has arisen with regard to the Medical and Veterinary Section of the Indian Science Congress, to be held in Calcutta during the first week of January, 1928. The Seventh Biennial Congress of the Far Eastern Association of Tropical Medicine is to be held in Calcutta from December 5th to December 10th, 1927. Under these circumstances, it is exceedingly likely that the majority at least of the papers which

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would ordinarily have been presented at the Medical and Veterinary Section of the Science Congress will be submitted to the F.E.A.T.M. Congress. Also that the attendance at the Medical and Veterinary Section of the Science Congress will be very greatly reduced by the absence of delegates who would ordinarily have attended it, but who in 1927-28 will attend the F.E.A.T.M. Congress, but will not stay on in Calcutta for the Science Congress.

Under these circumstances there are two alternatives: (*a*) to hold the Medical and Veterinary Section of the Indian Science Congress in January, 1928, if a sufficient number of members is likely to attend, and a sufficient number of papers of merit to be submitted; or (*b*) to abandon the meeting of the Medical and Veterinary Section for this one year; the Veterinary Section being incorporated with the Zoological Section of the Congress, if a sufficient number of papers are submitted.

It is possible that there may be a sufficient attendance and a sufficiency of papers of merit for *both* the F.E.A.T.M. Congress in December, and for the Medical and Veterinary Section of the Indian Science Congress in January: but, so far, the response to the appeal made in our issue for last May has been very disappointing.

Will those who (*a*) expect to attend, and (*b*) submit papers to be read at the Medical and Veterinary Section of the Indian Science Congress in Calcutta in January, 1928, please inform Major R. Knowles, I.M.S., Calcutta School of Tropical Medicine and Hygiene, at the earliest possible date? Unless the response to this appeal is better than it has been so far, there is no alternative other than to abandon the meeting of the Medical and Veterinary Section of the Science Congress for 1928.

British Social Hygiene Council, Summer School.

KEBLE COLLEGE, OXFORD.

KEBLE COLLEGE, OXFORD, is to be the headquarters of the summer school of the British Social Hygiene Council, the last meeting of which took place nearly a year ago at Balliol College, Oxford.

This year the school will be held from August the 3rd to the 9th. There will be two courses of lectures; one on biology and social hygiene, given by Professor J. Arthur Thomson, and the other on psychology and social hygiene, by Dr. H. Crichton Miller. Public and discussion meetings are to be held on such subjects as "Women and Venereal Disease" by Dr. Letitia Fairfield; "A Survey of the Social Hygiene Movement" by Mrs. C. Neville Rolfe, who has just returned from a long tour in India; and "Education and Social Hygiene" by Mr. Z. F. Willis, Educational Secretary of the Y. M. C. A.

The school is open to all those interested in social welfare, and applications for membership should be addressed to the Secretary, The British Social Hygiene Council, Carteret House, Carteret Street, London, S. W. 1.

The Lister Centenary.

ON April the 7th 1927, there was celebrated in London, Edinburgh, and Glasgow the centenary of the birth of Lord Lister, the man who created modern surgery. Of all the interesting functions which took place upon this occasion perhaps none was more engrossing than that which was held at the Wellcome Historical Museum, where Lister's original surgical ward at the Glasgow Royal Infirmary, dismantled to make room for modern improvements by the Board of Managers, has been re-erected. This ward has now been reconstructed from the original materials in the Wellcome Historical Museum, and it will be a treasured shrine to future generations in its new setting.

We have dealt recently with Lord Lister's life in reviewing the third (1924) edition of Sir Rickman Godlee's *Lord Lister*, whilst in our next issue we hope to review Dr. J. R. Leeson's rather more intimate sketch of the master. We may however perhaps recall the more salient points of that wonderful and epoch-making career.

Joseph Lister, the father of antiseptic surgery, was born on April 5th, 1827, one hundred years ago. After studying at University College Hospital, London, he was appointed at the early age of 26, assistant to the Regius Professor of Surgery, Edinburgh: here he remained until 1861 when he was called to the chair of surgery in the University of Glasgow. This post he held until 1869 and it was chiefly during these eight years that he laid the foundations of antiseptic surgery. From 1869 to 1877 Lister was Professor of Surgery in the University of Edinburgh. In the latter year he was invited to fill the Chair of Surgery at King's College Hospital, London: this post he accepted. He retired from the staff of King's College Hospital in 1893 at the age of 66: he was created a peer in 1897, and died on February 10th, 1912, in his eighty-fifth year.

It is well-nigh impossible for us to realise the state of affairs prior to the Listerian era. The surgical wards reeked from the smell of putrefaction, and the mortality from sepsis and hospital gangrene was appalling. The genius of Pasteur had recently solved the problem of fermentation. Lister worked along similar lines in the surgical field, and by applying to the injured part as a dressing 'some material capable of destroying the life of the floating particles' i.e., bacteria, he achieved results which had hitherto never been dreamed of. The dressing in the first instance consisted of crude carbolic acid: from this basis Lister and his pupils Watson-Cheyne, Macewen and others evolved the aseptic technique as we now know it. The results of Lister's work were momentous: operation mortality and morbidity diminished in positively dramatic fashion, surgical procedures were evolved which had hitherto been quite inapplicable: the whole art and practice of modern surgery became in fact possible.

That 'a prophet hath no honour in his own country' is a truism the accuracy of which was fully demonstrated in Lister's case. His work was appreciated and lauded in other countries at a time when his colleagues in London regarded him with hostility and contempt. The undoubted value of the antiseptic method soon broke down all barriers of opposition and before his death the master—happier in this than many other men of genius—had the satisfaction of seeing his work universally accepted and the fruits thereof gathered in.

Of a gentle and kindly nature, a steady and deliberate rather than a "showy" operator, Lister will go down to posterity as one of the greatest benefactors of mankind, a worthy colleague of Hunter, Pasteur, Simpson and Manson. It is fitting that the centenary of his birth should have been made the occasion of appropriate celebrations in London, Glasgow and Edinburgh. May we not also add our quota of homage to the master's memory?

We hope in a later issue to publish extracts from the many, and many of them notable, speeches made by the leading surgeons in Great Britain on the occasion of the Lister centenary. In the meantime, we may quote from the *Lancet* of April 9th, 1927.

"The week now ending has seen a memorial triumph unparalleled in any branch of human endeavour. From all countries, and various sources in those countries, there has come a general endorsement of the view held

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Intestinal Disinfection

The following striking tributes to the therapeutic value of intestinal disinfection will direct the attention of the general practitioner to the many conditions in which the new benzene derivative Dimol is indicated--and incidentally bear out the contentions of Charcot and Metchnikoff that ninety per cent. of all human ailments have their origin in intestinal toxæmia.

DIARRHOEA AND DYSENTERY.

"I have nothing but unqualified praise for the effects of Dimol in the series of cases in which I used it, including a wide variety of intestinal intoxications from mild but persistent diarrhœas, colics and ptomaine poisoning of choleraic type, to fulminating dysenteries, with passage of large sloughs and great hæmorrhage. Accept my hearty congratulations on the discovery of what looks like a specific for control of the poisonous flora of the intestine."

——, M. B., B.Ch. Dub.

Malay States, August 29, 1922.

REDUCTION OF STREPTOCOCCUS IN FAECES.

"I am using and recommending Dimol very extensively. I find it exceedingly useful, and a comparison of fæces plates before and after continued use of Dimol shows a striking reduction in the Streptococcus content—a very important factor."

——, M.D., M.R.C.S. Lond.

Wimpole Street, W. 1, October 10, 1921.

INTESTINAL INTOXICATION.

"In my own experience of at least a dozen cases of intestinal intoxication of long standing, associated with septic tonsils and carious teeth, the results brought about by the use of Dimol have been most gratifying."

——F.R.C S. Ed.

Brook Street, W.1, September 26, 1921.

INTESTINAL TOXAEMIA IN CHILDREN.

"I have made an extended trial of your Dimol syrup. I have found it extremely useful in chronic cases of intestinal toxæmia in children."

——, M A., M.D Oxon.

Harley Street, W.1, September 3, 1921.

INTESTINAL STASIS.

"The laboratory findings of this drug suggest a great field for its clinical use. It has afforded very beneficial results in the many cases in which I have employed it."

——, M.B. Lond., F.R.C.S. Eng.

Cavendish Square, W.1, May 1, 1922.

URTICARIA.

"In those cases in which I have used Dimol, which include obstinate urticaria in two young children, I have had excellent results."

——, M.B., B.S. Durh.

Northumberland, October 12, 1921.

LAB. CONFIRMATION OF CLINICAL EVIDENCE.

"I have used Dimol very largely and am finding it of great service in appropriate cases. I have seen no bad effects from its use. When I first began using it I had several bacterial estimations made before and after and found your claims borne out."

——, M.D., B.Sc., F.R.C.P. Ed.,
Professor of Medicine,——University.

November 5, 1921.

TOXAEMIC HEADACHE.

"I have been trying Dimol and there is no doubt whatever that it is the very thing I have been looking for and trying for many years to obtain. . . . I am delighted with it.

"I am personally most grateful for Dimol. I used to get intestinal fermentation and toxæmic headaches continually; Salol was no good at all, but Dimol relieves the symptoms in less than one hour."

——, F.R.C.S. Eng.

Hants, July 17, 1921.

RHEUMATOID ARTHRITIS.

"My clinic deals largely with gastro-intestinal auto-intoxication and its many consequences. I have formed the highest opinion of the value of Dimol and use it largely. It has done especially good service in many cases of rheumatoid arthritis attended with indicanuria and with excess of the aromatic sulphates and also in a very large number of cases of high arterial tension. I have never seen any disagreeable symptoms caused by the steady and persistent use of this remedy."

——, M.R C.S.

Derbyshire, September 2, 1921.

COLITIS.

"I have used Dimol in cases of colitis and irritative diarrhœa with excellent effect, and I intend to test its uses further. It promises to be a valuable addition to therapeutic resources."

——, M.D. Lond.

Devon, October 12, 1921.

BOWEL TOXAEMIA.

"Now that the problem of intestinal disinfection has been solved by the introduction of the new benzene derivative Dimol, it is possible to clear out the immediate cause of the trouble (bowel toxæmia) *in situ*."

——, M.D. Ed.

Cavendish Square, W.1, June 2, 1922.

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by the medical profession that Lister's work has effected more for the happiness of the world than any work of any one man. No man's work is his own single production, and Lister, like Newton, employed in his great centralisation the brilliant researches of others, notably of Pasteur, whose chemical investigations of putrefaction directed the great surgeon in his search for the control of sepsis. There is no necessity to swell here the fully merited chorus by giving any detailed story of Lister's discoveries and procedures. If we admit that there might have been this necessity 25 years ago, it is only to point out that thereby Lister's fame is enhanced for it is shown to have grown with the passage of years; it is the incidental discovery which requires rediscovery, while the leader of the successful revolution goes from height to height in the world's esteem as the fruits of that revolution become more abundant and more demonstrable.

The reason of these tributes may be found in a short article, reprinted from a volume of *The Lancet* published exactly 60 years ago, in which Lister gave his first message to the medical profession at large respecting his great discoveries. The passage quoted is from the opening of an extended series of communications dealing with compound fractures upon antiseptic lines, and we can but admire the wide vision, the accurate knowledge, and the simplicity with which the message was delivered. The written words exactly fit the various character pictures. In 1867 we are back in a time when it was the rule for an open wound to heal up by a process of suppuration, when the unfortunate victim of a compound fracture was submitted at once to amputation in view of the risks from septic fever, and of the frequent occurrence in surgical wards of death from gangrene or pyæmia. At this early stage of his researches Lister was able to show that many of these terrible conditions could be avoided by the routine treatment of the application of carbolic acid to the exposed surfaces or abscesses. And he is content to leave his words to be judged by his colleagues, to them 'that follow after righteousness.' There is abundant evidence throughout the report of the scientific gift and assiduous research that must have been precedent to them, but not a word of personal protest. As His Majesty the King said when receiving at Buckingham Palace on Monday last the delegates of the Lister Centenary from all parts of the civilised world: "Lister removed the horrors of sepsis from surgical operations, and for this he is rightly described as the father of modern surgery." He filled this position, which by acclaim was allowed him during his life with a simplicity that was as remarkable as his claims were pre-eminent."

Bombay Medical Council.

THE following summary of the proceedings of the Bombay Medical Council meeting held on February 25th, 1927, is published in the medical press for information.

(1) At a meeting of the Bombay Medical Council held on the 25th February 1927, Sir Norman Walker, M.D., F.R.C.P., Representative of the General Medical Council of Great Britain, and Colonel R. A. Needham, C.I.E., D.S.O., M.D., F.R.C.P., D.P.H., who accompanied him on his tour through India, were present by invitation.

(2) Captain Narayan Hari Kulkarni, M.C.P.S., B.M.S., took his seat as an elected member of the Bombay Medical Council, *vice* Mr. Krishnaji Govind Lohokare, Hospital Assistant, deceased.

(3) The following Resolution was then passed:—

"That the Council place on record their sense of loss at the untimely demise of Dr. K. G. Lohokare, B.A., *Ex* M.L.A., who was an elected member of the Council from 1920 to the time of his death;

and that a copy of this Resolution be communicated to the members of his family."

(4) The case of Mr. Balvantrai Naranji Desai, practising at Vadi Falia, Surat, was concluded, and it was decided that his name be struck off the Register, for unprofessional conduct, *viz.*, advertising, the purport of the advertisement in leaflet form being as follows:—

Remedy for cent. per cent. cure of Hydrocele.
By Balvantrai N. Desai, L.M.S.

(5) An application from Mr. Narayan Moreshwar Bhagwat for permission to be registered under Section 7 (3) of the Bombay Medical Act, on the ground that he had been working as a medical practitioner for the past seventeen years, was rejected as the applicant had not completed a course of training in any medical institution.

(6) An application from Shaikh Abdul Kadir for permission to be registered under section 7 (3) of the Bombay Medical Act was also considered, and taking into consideration the services rendered by him during the War and his training at the Grant Medical College, his application was favourably considered as a special case.

(7) The name of Muhammad Sahib Bakshubhai was erased from the Register, owing to his conviction for a cognizable offence.

(8) The following decisions of the Royal College of Physicians and Surgeons, Edinburgh, were communicated to the Council:—

(*a*) Edalji Jamsedji Treasurywala, L.R.C.S.E. (Triple) 1894 (alleged advertising). Diploma re-called and declared void;

(*b*) Kaikhushru Edalji Master, L.R.C.S.E. (Triple) 1895 (alleged issue of incorrect medical certificate). Diploma suspended *sine die*.

(9) A revised Code of Medical Ethics was adopted, and it was resolved that copies be forwarded to all registered medical practitioners for information and guidance.

(10) The meeting closed with a special vote of thanks to the President, Major-General A. Hooton, C.I.E., I.M.S., in view of his impending retirement before the next meeting.

Reviews.

MALARIA: CURSE, CAUSE, CURE.—By Elisabeth, Countess of Carnarvon. London: John Bale, Sons & Danielsson. Pp. 52. Paper Covers. Price, 1s.

THIS little pamphlet is admirable. It is exactly what is wanted to instruct the layman about how to deal with malaria, and in a foreword, Sir Ronald Ross especially commends the book to this class of readers. The information in it is extraordinarily complete for a volume so small, and much of it it will be useful for reference, even to medical men. Under larvicides, Paris green, paraffin, cresol, and larvæ-eating fish are dealt with. The introduction of mosquito-catching stations in towns, self-protection by householders, and anti-malaria organization in general outline, are dealt with. Under the heading "quinine," the varieties of cinchona and the conditions suitable for the growth of *Cinchona ledgeriana* in India are described; the sale of bark and the methods of manufacture in Java, India and Italy are briefly discussed, and notes given on remedies other than the cinchona alkaloids. The organization and work of the League of Nations' Malaria Commission and of the Rockefeller International Health Board is mentioned; anti-malaria legislation and the cost of different measures are discussed; and such information given as the price of quinine and other cinchona alkaloids in different countries.

The book is written with special reference to anti-malaria organization and work in Southern Europe; but it is a mine of information, and very well compiled.

A TREATISE ON MATERIA MEDICA AND THERAPEUTICS.—By R. Ghosh. Eleventh Edition by B. N. Ghosh, F.R.F.P. & S. (Glas.). Calcutta: Hilton and Co., 1927. Pp. 740. Price, 10s. 6d. or Rs. 7-8.

THE 11th edition of this well-known book, which has just come out, will be welcomed by the medical

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profession in this country. The book has been thoroughly revised and a number of new remedies such as Mercurochrome, Stibosan or von Heyden 471, Bayer 205, etc., have been included. A chapter giving a description of the essentials of ultra-violet rays and radium therapy has been added. There is no better book on the subject from the point of view of Indian students and practitioners, and we have no doubt that this edition will be even more popular than the last one.

WHEELER'S HANDBOOK OF MEDICINE.—By William R. Jack, B.Sc., M.D., F.R.F.P.S.G. Eighth Edition. Edinburgh: E. & S. Livingstone & Co., 1927. Pp. xv plus 630, with 34 illustrations. Price, 12s. 6d. net. Obtainable from Messrs. Butterworth & Co. (India), Ltd., Calcutta.

THIS admirable handbook has now reached its eighth edition—a sufficient index of its continued popularity. It is written in a clear, concise, and lucid style—the reader does not have to plough his way through a mass of boring detail, but at the same time no essential point is omitted. There are few alterations of a radical nature from the 1924 edition, but passing reference is made to some of the more important advances since that date, e.g., the work of the Dicks on scarlet fever, of McNee and Van den Bergh on jaundice, and of Adams, Blacklock, and others on disseminated sclerosis. The use of sanocrysin in tuberculosis, and the induction of benign tertian malaria in cases of general paralysis of the insane are also touched on.

As this manual is intended primarily for the use of students in temperate climates, the tropical diseases section is naturally not exhaustive. Mention is however made of the use of urea stibamine in kala-azar and of Bayer 205 in trypanosomiasis.

We hope the book will continue to enjoy unbroken its well-deserved success: alike to students preparing for their examinations in medicine, and to practitioners who may wish to refresh the mind, the volume can be most heartily recommended.

BIOLOGICAL RELATIONS OF OPTICALLY ISOMERIC SUBSTANCES.—By A. R. Cushney, M.A., M.D., LL.D., F.R.S. London: Baillière, Tindall & Cox, 1926. Pp. ix plus 80, with 4 figures and 7 tables. Price, 9s. net.

THIS book is the outcome of the Charles Dohme Memorial Lectures which were delivered by the author in America a few years ago. Professor Cushney, who is unfortunately no more with us, was the pioneer worker among the pharmacologists to investigate the relationship between optical activity of compounds and their pharmacological action, and his work on the hyoscyamines and hyoscines is well known. After making a historical survey of the subject, the author deals with the relation of enzymes and optically active bodies and with the decomposition of isomers in the living tissues. He shows that both enzymes and tissues differentiate between two isomers, and the choice is not always of the substance of the same sign of rotation. In the higher organisms the isomers occurring in nature are generally more readily destroyed than their counterparts which are formed artificially or at any rate occur more rarely. The third and fourth sections deal with the pharmacological aspects of the action of optically active isomers. By taking the examples of dextro- and lævo-homatropines, hyoscyamines, and adrenalins, the author shows the considerable variations in the extent to which the tissues differentiate between the isomers. The general predominance of the action of lævo-rotatory isomers on the tissues in the case of these compounds is very interesting, and it is remarkable that this is the compound which occurs in nature. The last section deals with the influence of configuration on pharmacological action, and the author shows that the factors concerned in the activity of optically active alkaloids such as hyoscyamine are (1) the general structure of the molecule, (2) the presence in the side chain of such groups as OH, and (3) the presence of an asymmetric carbon atom.

We are only just beginning to realise the significance of the biological relationship of optically active isomers, and we have no doubt that the publication of this work will stimulate research in this direction.

R. N. C.

BACTERIOLOGICAL ATLAS.—By Richard Muir. Edinburgh: Messrs. E. & S. Livingstone, 1927. Pp. 134, with 60 colour plates. Price, 15s. net. Obtainable from Messrs. Butterworth & Co. (India), Ltd., Calcutta.

THIS is an altogether admirable little handbook for the laboratory worker. The various stained films of bacteria, protozoa, and spirochætes have been carefully drawn at magnifications of from 1,000 to 1,500 diameters, and the drawings have been most admirably reproduced by the publishers. All the ordinary pathogenic bacteria are illustrated, together with some plates of involution forms: the illustrations of the various spirochætes—especially of *Treponema pallidum*—are excellent. Those of the parasitic protozoa of man are in many instances—especially with regard to the trypanosomes and entamœbæ—good; but the plates of *Plasmodium vivax* and of *Plasmodium malariæ* have unfortunately been accidentally transposed.

This small atlas will meet a much felt want, both for the laboratory worker and teacher of bacteriology and protozoology. It is also a most useful book for students, whilst its price is studiously moderate considering the excellence of the reproduction of the illustrations. The colour plates are perhaps a little diagrammatic, but are none the worse for that. Attached to each is a short explanation, giving the chief characteristics of the organism concerned. The bacteriological plates, especially, are admirable.

The book can be obtained from Messrs. Butterworth and Co., 6, Hastings Street, P. O. Box No. 251, Calcutta for Rs. 11-4-0. We can cordially recommend it to students and teachers alike.

ENZYMES: PROPERTIES, DISTRIBUTION, METHODS AND APPLICATIONS.—By S. A. Waksman, M.S., Ph.D., and W. C. Davison, M.A., M.D. London: Baillière, Tindall & Cox, 1926. Pp. xii plus 364, with 10 figures in the text. Price, 25s. net.

THE authors say in the preface that they have endeavoured to collect in as concise a form as possible the available information with regard to enzymes, and to indicate the original sources from which more detailed knowledge may be obtained. In this they have succeeded admirably. The book is divided into four sections. The first section deals with the rôle which enzymes play in biological processes, the chemistry of enzymes, and the reactions and factors which influence enzyme reactions. The second section deals fully with the distribution of enzymes in the animal and vegetable kingdoms. The third section describes the methods for preparation and study of different enzymes, and goes fully into the details of these processes. The last section deals with the practical application of enzyme activity, and discusses their uses in textile industries, tanning, brewing, clarification of fruit extracts, food preparations, and their use as therapeutic agents and as an aid in medical diagnosis. The book is full of useful information, it contains a bibliography of 1323 references, and will be of immense value to the research worker as well as to the general practitioner.

POLITZER'S TEXT-BOOK OF THE DISEASES OF THE EAR FOR STUDENTS AND PRACTITIONERS.—Revised and largely re-written by Milton J. Ballin, M.D., Ph.D. Sixth Edition. London: Baillière, Tindall and Cox, 1926. Pp. xiii plus 776, with 302 figures in the text. Price, 31s. 6d. net.

THE appearance after seventeen years of a new edition of Politzer's monumental work upon diseases of the ear, revised and largely rewritten by Dr. Milton J. Ballin, MD., PH.D., of New York has not quite come up to one's

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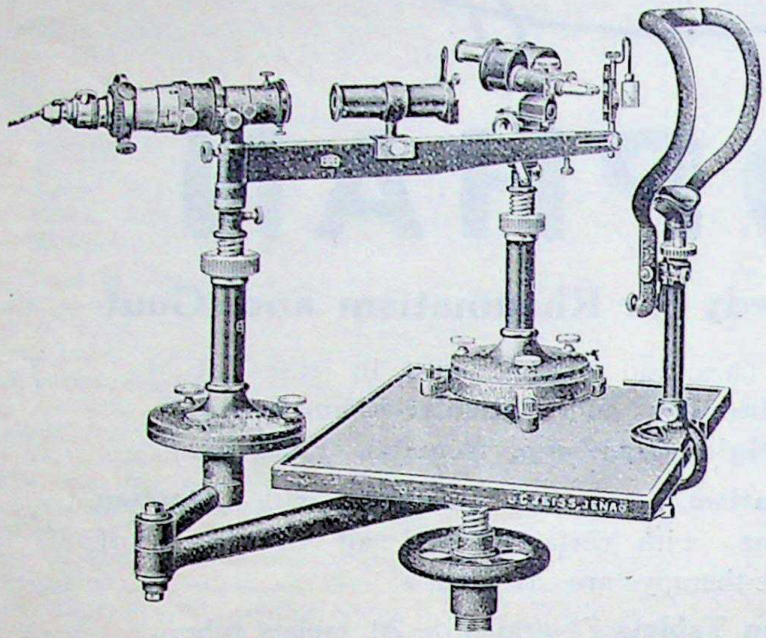

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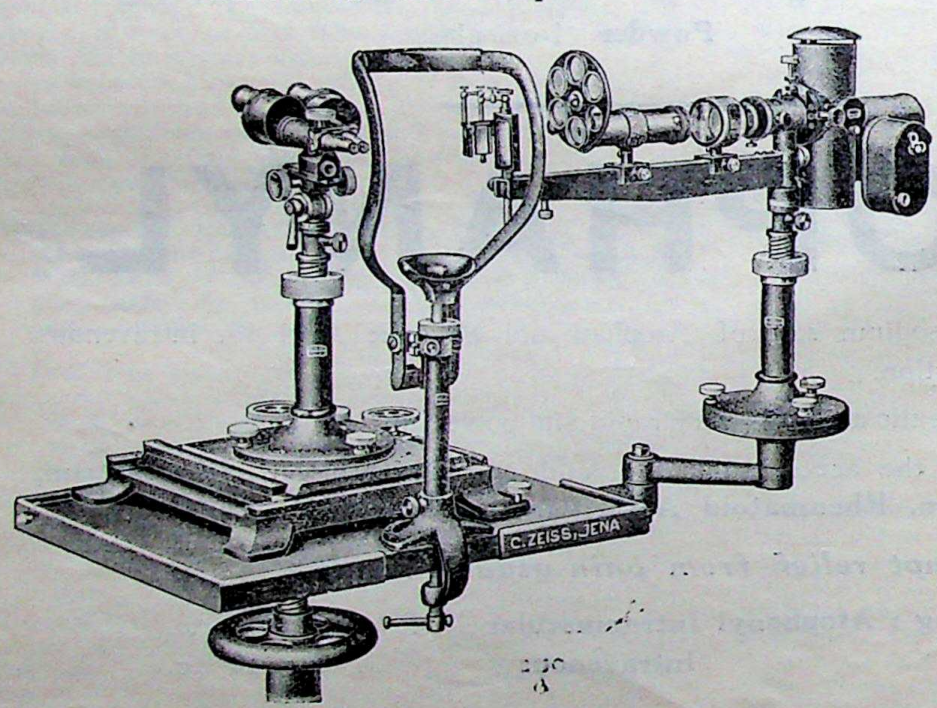

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expectations, since much that is new in the science of otology has been omitted altogether from its pages. On comparing for instance the account given of "new growths of the internal ear" in the present edition with that given in the last one of seventeen years ago, one finds that but for an alteration of a word here and there, they are identical. There is no material change made in the chapter. No account is given of the work of Cushing on the acoustic tumour. Among other notable omissions may be mentioned the complete absence of any reference to the method of treating chronic discharging ears by zinc ionization. The chapter on oto-sclerosis does not include any note of the work of Fraser, nor is any mention made of Baraing's noise apparatus, or of the now well-known Schulze monocord. The above are a few of the many omissions noted, and one is forced to conclude therefore that the work has not kept abreast of the times; though it still remains, by virtue of its magnitude and wealth of detail on other matters, the greatest of all books of reference upon the subject.

N. J. J.

CLINICAL APPLICATION OF SUNLIGHT AND ARTIFICIAL RADIATION.—By E. Mayer, M.D. London: Baillière, Tindall & Cox, 1926. Pp. xvi plus 468 with 37 plates and 16 figures in the text. Price, 45s. net.

ACCORDING to the author, the writing of this volume has been prompted by a desire to determine the nature and action of light and its relation to disease, more particularly as applied in the therapy of tuberculosis. His personal experience has mainly to do with the use of the mercury quartz light in clinical tuberculosis.

The work is a very comprehensive one, embracing the following subjects: the nature of radiation, the action of light in animal and plant life, the action of light on growth and nutrition, the effect of radiant energy upon bacteria and related biological products, the physiological action of light, the skin as an organ, the sensitization of tissues to light, the influence of climate on solar radiation, the clinical application of solar and ærotherapy, sources of light used in therapy, clinical studies with artificial light, dosage and technique in the clinical use of artificial light. Indications and contra-indications for irradiation, and the *x*-ray treatment of tuberculosis are also dealt with. The subject-matter occupies 368 pages.

Many chapters of this exhaustive treatise will interest only the scientist, physicist, or botanist, and from the point of view of the medical man must be looked on as additional matter.

On the other hand subjects such as the measurement of ultra-violet radiation are dealt with exhaustively.

Throughout the book references are numerous, and there is an extensive bibliography at the end.

This volume can be recommended as a work of reference to those interested in the physiological and therapeutic action of sunlight, artificial radiation, and allied subjects.

J. A. S.

MALARIA, ITS INVESTIGATION AND CONTROL, WITH SPECIAL REFERENCE TO INDIAN CONDITION.—By Major R. Knowles, I.M.S. and R. Senior-White. Calcutta: Thacker, Spink and Co., 1927. Pp. 220, with 41 text illustrations and 5 colour plates. Price, Rs. 7-8-0.

IN compiling this work the authors have aimed at the production of a practical and simple handbook for the use of those who are engaged on field work in connection with the investigation and control of malaria. It may be said at once that they have succeeded admirably in their task.

The first two chapters are devoted to a description of the parasites of malaria and of their cycle in man and in the mosquito. They are well and lucidly written, and the diagram representing the life cycle of *Plasmodium falciparum* is the best we have seen. It is evident, however, that the coloured plates depicting the various parasites have suffered in reproduction. It is possible that the theory of the causation of relapses in malaria put forward may not meet with universal approval, whilst in view of the researches of Schüffner, Christophers and others, the unqualified statement that the number of crescents bears no relationship to the number of asexual forms present is liable to misinterpretation.

The chapter on practical laboratory work and diagnosis will be found of great value, whilst Chapter IV gives an admirable account of the latest methods of treatment.

The last two chapters are devoted to malaria surveys and anti-malaria measures and contain much valuable information based on the junior author's practical experience in the field. Christophers' method of spleen measurement is described in detail, though the statement is made that "unless time is of no importance refinements of this nature seem impracticable." If this is the opinion of the writer, it may perhaps be asked why seven pages of so small a book should have been devoted to a description of the method.

There are four appendices, devoted respectively to notes on the breeding-places and distribution of the Indian anophelines, keys to the identification of adults and larvæ, and a specification for construction of under drainage issued by the Public Works Department of the Federated Malay States. These should prove of great assistance to field workers, whose library of scientific works is necessarily limited.

A certain number of errors occur in the text, which it is hoped will be corrected in future editions. On page 20 the work of MacGilchrist in Alipore has been confused with that of Sinton in Lahore. It was the latter observer who recorded a 34.2 per cent. incidence of crescents among Indian patients after a careful search. On page 41 it is stated that *A. funestus* has been found to have a sporozoite rate of from 3 to 10 per cent. in Bombay. These figures undoubtedly refer to the results obtained by Bentley in the case of *A. stephensi*, which should surely be included among the three most important malaria carriers in India. Again, in the description of Sinton's method of testing for quinine in solution on page, 97, the word "weaker" in line 22 should be "stronger."

These are minor blemishes in an otherwise excellent work. The authors are to be congratulated on producing a book which supplies a long-felt want. The very moderate price at which it is published, considering the large number of plates and diagrams with which it is illustrated, bring it within the reach of all, and it should undoubtedly form part of the equipment of every field worker and student of malaria in India.

J. COVELL.

THE MEDICAL ANNUAL, 1927.—Bristol: John Wright and Sons, Ltd. civ. plus 624 plus 159 pp. Profusely illustrated. Price, 20s.

THERE is probably no other annual publication in general medicine and surgery to compare with the *Medical Journal*, of which this is the 45th annual issue. In its main section, the "Dictionary of Practical Medicine," there is put together in some 550 pages a concisely written and admirably illustrated epitome of the progress made during the previous year in medicine, surgery, obstetrics, hygiene, ophthalmology, radiology, and the various branches of medicine. The authors are a group of the most distinguished and authoritative writers on their different subjects in the United Kingdom. Thus Professor Eurich of Leeds University, Special Referee to the Home Office for Anthrax and allied industrial infections, writes the article on anthrax. Dr. W. E. Fothergill of Manchester contributes the sections on gynæcology and obstetrics; Mr. Hey Groves writes on orthopædic surgery; Dr. Thurstan Holland on radiology; Lieut.-Col. A. E. J. Lister, I.M.S. (retd.) on eye diseases; Mr. Lockhart-Mummery on rectal surgery; Sir James Purves-Stewart on diseases of the nervous system; Mr. Rendle Short on abdominal surgery; and Sir W. Ireland de Courcy Wheeler on general surgery. These are but a few of the many distinguished contributors to the volume.

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In two special sections, readers in India will be especially interested. Lieut.-Col. V. B. Green Armytage has contributed to this year's issue a special and very valuable article on gynæcology and obstetrics in the East; an essay of some six pages in which he lays special emphasis on the differences between the practice of obstetrics in the East and West. Secondly, the sections on tropical diseases are, as usual, by Sir Leonard Rogers. To merely state so, is to emphasize that they are clear, full and authoritative.

This year's issue contains nothing very startingly novel. But is does show what great advances are constantly being made in medical and surgical methods. It is a year of great advance in practical detail, rather than of anything revolutionary. The ever increasing attention paid to acute infections of the central nervous system is well brought out in the volume. In surgery, the possibilities of operation on the diabetic, thanks to insulin therapy, are discussed. Typhoid abscess of the spleen is a condition amenable to ordinary surgical treatment. In appendix abscess opinion is growing in favour of a two-stage operation. A monograph of special interest, and one which is admirably illustrated is that on diseases of the pituitary gland by Mr. N. M. Dell, F.R.C.S. (Edin.); in this the anatomy, development, physiology, diseases associated with disturbances of function of the gland, and their medicinal or operative treatment are discussed. Neurological surgery also is fully dealt with. Among many sections dealing with orthopædic surgery is a very interesting one on the subject of painful backs. The article on phototherapy is one of very great interest, and illustrated with splendid photographs of the Treloar Cripples Hospital and of the little patients with surgical tuberculosis treated by phototherapy at Alton.

The sections dealing with radiological procedures and therapy, and electro-therapeutics in general are very interesting, and show how rapidly this science—or rather these sciences—are developing. In obstetrics, the treatment of accidental hæmorrhage has been considerably revised of recent years; the best treatment is the least enterprising; careful nursing will do much, and operation is usually counter-indicated. A warning is issued as to the dangers of the Rubin diagnostic inflation test of the Fallopian tubes. Menorrhagia and a study of the paths in pelvic infection are also the subjects of special articles.

Of new and recent drugs, novasurol, a drug with marked diuretic properties in cases of cardiac dropsy, has been found to give excellent results. Mercurochrome is now being used intravenously in many cases of septicæmia and pneumonia. In acute pulmonary œdema, the value of atropine is stressed.

In the introduction, the editors remark, "We find that in this volume, as in so many of its recent predecessors, we can discern two great simplifying forces striving to impart order and direction to modern medicine. The first is a disposition to think in terms of causes. This instinct is as old as the study of medicine itself, but there is still room for the application of its beneficent influence. The second, a tendency to use the simple forces of nature as therapeutic agents, is perhaps a little obscured by the analytical habits of the human mind. We are not content to know that sunlight and fresh air are helpful in the struggle against disease; we want to know how and why they are helpful. So far as the therapeutic effects of light are concerned, the inquisitive instinct will find much to satisfy it in the article on phototherapy."

In addition to the main body of the volume, there are the usual appendices and other sections. In "The Editor's Table" the progress of pharmacy and dietetics is dealt with, and new drugs and apparatus and surgical instruments described. Lists are given of medical books published during the year, of mental institutions, homes, spas, etc., and a useful selected medical trades directory. The advertisements add to the value of the book, for they contain a tremendous amount of useful information. Finally, one must pay a work of tribute to the excellence of the colour plates, and of the very numerous illustrations.

No medical man, whether general practitioner, consultant, or specialist, will regret purchasing the *Medical Annual*. It is a mine of useful and collated information; a book to study for its record of new progress, also a reference work of great value. Our continued wonder is how the publishers can bring it out at the price of only £1 sterling. The man who "buys one book a year"—and there are many such in India—will find this volume his best selection; on the other hand the man who is trying to keep up with modern work will order his copy in advance. It is already available from the different medical booksellers in India.

Annual Reports.

ADMINISTRATION REPORT. GOVERNMENT OPHTHALMIC HOSPITAL, MADRAS, FOR THE YEAR 1925. SUPDT., MADRAS GOVT., PRINTING. PRICE, RE. 1-4-0. ADMINISTRATION REPORT, GOVERNMENT OPHTHALMIC HOSPITAL, MADRAS, FOR THE YEAR 1926. SUPDT., GOVT. PRINTING, MADRAS. PRICE, RE. 1. BOTH REPORTS BY LIEUT.-COL. R. E. WRIGHT, B.A., M.D., D.P.H., I.M.S., SUPERINTENDENT.

WE regret very much that the report of this hospital for 1925 has been previously overlooked in these columns, whilst that for 1926 has recently come to hand. We may therefore take the opportunity to review both together. They are worthy of the celebrated school of ophthalmology in Madras, and are of interest—not merely as administrative reports—but for their wealth of clinical material reported on, and for their discussions of different procedures in ophthalmic work.

Turning to the 1925 report first, the hospital was so crowded during the year that surplus sick had to be accommodated on the verandahs. In all 22,457 out-patients and 3,861 in-patients were treated during the year. Of the diseases treated inflammatory catarrhal conjunctivitis comes an easy first in numbers, senile cataract a good second—with 3,708 cases, whilst the figures for inflammatory ulceration, aphakia, and astigmatism are also high. One hundred and seventy-two medical students received teaching during the year, and 34 post-graduate students. Dr. G. Zachariah remained attached to the hospital during the year as an honorary member of the staff, and was given charge of 30 beds.

Coming to the professional side of the report, we have here a document of great scientific value, illustrated by splendid photographs. With regard to *cataract* 1,359 operations were performed, 1,200 of them being capsulotomy extractions with a success rate of 88.8 per cent., and a partial success rate of 5.6 per cent. Iris prolapse and impactions amounted to 7.8 per cent. of the cases, and both conditions are treated by picric acid drops and eserine installations; this method frequently causes small impactions or even small knuckles of iris to disappear back into the anterior chamber. In 27 cases there was delay in the formation of the anterior chamber. If the chamber remains empty for two or three days a central U-shaped keratitis is apt to set in, being really a disturbance of Descemet's membrane where the cornea overlies the pupil and coloboma. Mild cases may clear, but in more severe cases the condition is permanent. Heating the lips of the wound with the electro-cautery, dionine instillations, and sub-conjunctival injection of cyanide of mercury (1 : 4,000) into the lower fornix are the measures advocated for dealing with the condition.

Of the 1,200 cases operated on, 180 showed evidence of uveitis when examined prior to operation. Further, albuminuria was present in 141, glycosuria in 25, and marked anæmia in 26; syphilis was very frequent, many patients had allowed the cataract to go on to hypermaturity, many were very aged or enfeebled or

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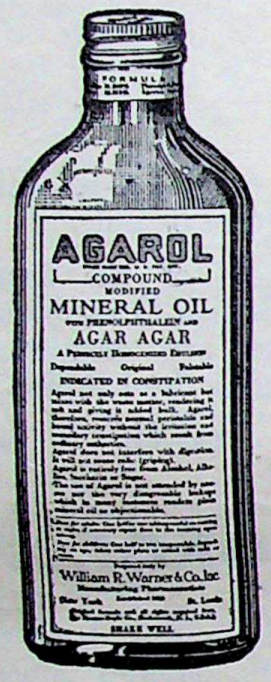

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ill-nourished. The material in fact is in poor condition for operation, and the results—when this is remembered—are very good indeed. Pyorrhœa, dental and focal sepsis, gut infections, and above all anæmia due to ankylostomiasis and ascariasis, are exceedingly frequent in these patients in association with this uveitis and may be predisposing or even causative factors. Contrary to what is the case in Europe, the tubercle bacillus is but rarely encountered as a cause of uveitis. The response of the usual dark-brown type of iris seen in Indian patients to mydriatics is not as good as might have been anticipated, and the reasons for this are being investigated. Since Colonel Elliot's time in 1901, records of all cataract cases have been carefully kept; their total number is now over 20,000, and these records are now being analysed with a view to throwing light upon the ætiology of cataract in India.

Discissions for cases other than after-cataract numbered 38; viz., 26 for juvenile cataract, 3 for zonular cataract, and 9 for traumatic cataract. The juvenile cataract rate is about 0.1 per cent. of the cataracts seen; for the most part the cataracts are membranous in type, and sometimes—but only infrequently—evidence of either congenital syphilis or severe anæmia is obtained.

A "tip" in the operation for cataract which the Madras School has especially brought forward is blocking of the facial nerve by injection of novocaine and adrenalin into the site of emergence of the main trunk at the stylo-mastoid foramen. This is especially used for those who try to squeeze the eye during operation. Paralysis sets in very soon and lasts for an hour; the difficulties and anxieties of the operator are greatly reduced, and the results are so good that the method has been adopted for routine use.

Sclero-corneal trephining for *glaucoma* was carried out in 112 instances. Some of the more desperate cases are now dealt with by posterior sclerotomy followed immediately by iridectomy. The bulk of the glaucoma cases come within a congestive group, mostly a chronic passive congestive group. Contrary to the findings in America of Magitot and Bailliart, in India the majority of cases of chronic glaucoma do not show an associated high blood-pressure. "One is constantly brought back to the rôle of the vitreous," writes Colonel Wright; what the change in the vitreous in the glaucomatous eye is it is hard to say, but it emphatically differs from normal vitreous. Possibly a swelling of the colloids, due to an increased absorption of its salts and increased osmotic pressure of these in the interstices of the colloid meshwork will account for it. The matter is under full investigation in conjunction with Major Clive Newcomb, Chemical Adviser to the Madras Government, though it is difficult to obtain normal vitreous for comparison. In the investigation of the behaviour of the vitreous as a gel may lie the secret of the causation of glaucoma.

In operative procedures on painful eyes, and particularly in iridectomy for secondary glaucoma, a retrobulbar injection of 1 to 1.5 c.c. of 2 per cent. novocaine to which a few drops of 1:1,000 adrenalin has been added, has proved a valuable measure. In chronic congestive glaucoma sub-conjunctival injections of adrenalin may occasionally prove of use, but only in some patients.

In the refraction room 2,232 cases of errors of refraction were examined, and 527 of fundus disease. An investigation is being carried out into the causation of retinal hæmorrhage in young persons; of 20 cases seen, the urine was normal in all; 4 showed evidence of venereal disease, 2 of tuberculosis, 1 of marked anæmia, and 1 had myocarditis. The subject requires further investigation, however. A polyvalent high titre antipneumococcus serum was tried by eye instillation in cases of ulcus serpens, but did not give good results; on the other hand milk injections proved of marked value in this disease, and also in many other inflammatory conditions of the eye.

The Pathological Department of the hospital does an enormous volume of work, and special enquiries were set on foot in this department during the year, in addition to the extensive routine work. Capt. T. W. Barnard continues to do excellent work as radiologist to the hospital.

The report ends with a record of cases of special interest seen during the year, illustrated by excellent photographs on art paper. In these the ophthalmologist will be especially interested. Considerations of space prevent our dealing with them, unfortunately. They include two cases of aspergillus infection of the orbit, an account of a plastic operation for crescentic defect of the lower eyelid caused by the application of irritant remedies, herpes ophthalmicus associated with optic atrophy, a case of cystic epithelioma in a male patient, aged 24, notes on Kirkpatrick's type of macular keratitis, and a report of a case of osteoma of the frontal sinus with extensive involvement of the roof of the orbit.

* * * * * * * *

Turning to the report for 1926, the surplus sick had again to be accommodated on the verandahs. In-patients numbered 3,898, and out-patients 23,412. The same chief diseases were prevalent as in the previous year. One hundred and eighty-seven medical students and 33 post-graduate students received training during the year. Government established a special certificate to be given to those who undergo nine months post-graduate training at the Hospital and satisfy two examiners.

Cataract as usual was one of the chief subjects of attention. The total number of operations was 1,601, of which 1,364 were carried out by capsulotomy. Vitreous escape in straightforward cases is only 1.46 per cent. A curious feature which accounts for some of the cases of iris prolapse (iris prolapse rate in general 8 per cent.) is the prevalence of bugs in the hospital, which interfere with the dressings. Blocking of the facial nerve by injection of novocaine-adrenalin into its main branch at its exit from the stylo-mastoid foramen has now become a routine practice in cataract operations. On the other hand, injection of adrenalin-novocaine into the neighbourhood of the ciliary ganglion may have a detrimental effect on healing of the corneal section, and total ophthalmoplegia may be disadvantageous in cataract work. "On one point" writes Colonel Wright, "we have formed a strong clinical opinion, that it is a great disadvantage to leave blood in the anterior chamber. The fibrin seems to form a scaffolding for cellular elements to build upon. The research work mentioned shows how great is the danger of introducing organisms into the anterior chamber at the time of operation."

Towards the end of the year Dr. A. S. Green of San Francisco paid a visit to the hospital and demonstrated his improvement of Barraquer's original erisphake technique by the introduction of an automatic foot-control, a method which gives the operator much greater confidence and more delicacy of technique. "One has no quarrel with the intracapsular operation when done perfectly in so far as the immediate post-operative result is concerned," writes Colonel Wright. It is the late results which count; and here the figures published by Knapp of New York in 1925—though only referring to 85 out of 200 patients operated on are of interest. Theoretically to remove the capsule as well as the lens is ideal, but in actual practice capsulotomy gives as good results, and the late results are better. "I feel convinced that the risk of vitreous escape with the intracapsular method is greater than with capsulotomy. I have been strongly of opinion that an operation in which there is a vitreous escape is a failure, though not necessarily an absolute failure..... One must try to find out a method of removal which reduces the operation risks to a minimum. We have tried numerous methods here, but up to the present have not come across one which is so free from risk as Barraquer's method as modified by Dr. Green."

During the year, a special grant was received from the Indian Research Fund Association to commence a bacteriological investigation of the iris tissue removed when making the iridectomy during routine cataract extractions, and Mr. Theodore of the King Institute, Guindy, was deputed for this work. The meticulous attention to attaining complete surgical asepsis which Colonel Wright adopts is detailed in the report, and certainly one might expect that all outside sources of sepsis would be excluded by this technique. Of 205

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pieces of excised iris cultured in various media, 44 gave positive findings. The chief organism present was a Gram negative cocco-bacillus, which produced iritis with hypopyon when inoculated into the anterior chamber of the eye in rabbits. In spite of the exceedingly careful technique employed in rendering the field of operation sterile, cultures from the conjunctival sac just prior to operation gave 45 per cent. of positive findings—chiefly staphylococci. The Gram negative cocco-bacillus encountered in iris cultures was not obtained from the conjunctival sac, nor from the fluids used to irrigate the eye, and it appears to be an organism of endogenous origin.

Sclero-corneal trephining was carried out on 96 cases of glaucoma. This figure is much less than in previous years, as other methods for advanced cases, such as iridectomy or sclerotomy or combined procedures, were on trial. Colonel Wright reports however that trephining seems to be the best way of keeping the tension down. In some very desperate cases with only perception of light, a measure which seems to be of value is to evacute 5 minims of vitreous with a needle through a posterior sclerotomy wound, immediately followed by a broad iridectomy.

In the refraction room 2,571 patients were attended to, of which 2,316 were pure refraction cases, and 435 cases of fundus disease. Trachoma presents a very difficult problem in Madras. In the first place merely granular lids are too often diagnosed by doctors in the Presidency as trachoma, and vigorous and injudicious treatment applied. Once the condition of trachoma has been got under control, application of a one-half per cent. hydrarg. perchloride ointment with extensive massage appears to be as useful a line of treatment as any other.

As usual, Colonel Wright's report ends with accounts of a series of individual cases of special interest, illustrated by excellent photographs on art paper. A case of chronic degeneration of the cornea was found to be associated with myiasis, ova of *Aphiochæta scalaris* being deposited on the diseased cornea: in a case of bilateral lymphoblastoma of the orbit with leukæmia very curious cell-inclusions were found in the large mononuclear leucocytes in blood films from the patient. These resembled bacilli with pointed ends, but blood cultures gave negative results. They were not unlike miniature Charcot-Leyden crystals. Two uncommon orbital tumours recorded are a primary intradural tumour of the optic nerve and a ganglionic neuroma of the orbit. A rare condition encountered in a Hindu female child five days old was partial union of the lid margins at birth—ankyloblepharon—narrow bands of tissue holding the margins of the lids together. In a case of extensive cavernous angioma of the orbit and pterygo-maxillary region, the growth was so extensive that pressure on the cheek caused the eyeball to be almost completely dislocated from the orbit: a partial tarsorraphy was done to save the cornea from ulceration, and the case referred for surgical advice to the General Hospital. In a case of Rhinosporidium infection of the conjunctiva, *x*-ray treatment was tried, but failed to cure the condition. A very interesting case recorded is one of abscess of the frontal lobe, running a course of six weeks duration, and until the end almost without symptoms, the earliest symptoms being chemosis of the conjunctiva with a slight diminution in vision. Congenital glaucoma was studied in a family of four brothers; of these the eldest, aged 27, was blind with buphthalmos; the second, aged 25, had 6|36 vision on each side with anterior chambers deep and marked cupping—he was operated on with good immediate results; the third showed nothing abnormal; the fourth, aged 15, had 6|5 vision in each eye with deep cupping. The right eye was trephined with good results. It is hoped to keep this family under observation.

Colonel Wright's reports are models of what such annual reports should be; the administrative and statistical side of the work is dealt with briefly and largely in tabular form, and the bulk of the report devoted to a discussion of matters of professional interest, notes on progress made, and cases of special interest. Of special value also are the excellent photographs, most of them being stereoscopic views of the patients referred to.

KASHMIR C. M. S. MISSION HOSPITAL. ANNUAL REPORT FOR 1926. KASHMIR STATE LEPER HOSPITAL. ANNUAL REPORT FOR 1926. BOTH BY DR. E. F. NEVE, M.D., C.M., F.R.C.S. (EDIN.).

THE annual reports of these two institutions are always of considerable professional interest, whilst the excellent photographs with which the first report is illustrated convey an admirable impression of the beautiful surroundings of the hospital and of the work carried on. The hospital was the pioneer medical institution in Kashmir, and comparative photographs of its west end prior to 1886 and in 1926 show what enormous improvements have taken place. It has always been warmly supported by the Maharajah of Kashmir, who gives an annual grant of Rs. 10,000 a year towards its expenses.

Dr. Norman MacPherson joined the staff from England in April 1926, and Dr. Neve took leave home in March. Out-patient attendances totalled 44,827 during the year, and in-patients numbered 1,983. Surgical operations numbered 6,471. The tremendous popularity of "Dr. Neve's Hospital," as it is locally known, is shown by the fact that the out-patient attendance in 1926 showed an increase of over 4,000; almost ten per cent. of the total. As the stable antiseptic in use, Dr. Neve notes that chlorine, electrolytically prepared locally from hypochlorite solution, is relied upon and fulfils all that is asked of it. A gift from the Countess of Reading during the year enabled the *x*-ray plant to be considerably improved. Cancer—with the exception of Kangri burn—is apparently rare in Kashmir.

With regard to eye diseases, 471 operations were done for entropion and trichiasis, and 117 for cataract. Glaucoma is common. Bone disease is also common and gives much surgical work; it is chiefly of tuberculous or osteomyelitic type; in syphilitic osteitis linear osteotomy with the electric saw often gives great relief. For tuberculous glands (133 cases during the year) excision is adopted as a rule, even in advanced cases. Appendicitis and enlarged prostate both appear to be very rare in Kashmir. On the other hand digestive disorders are extremely prevalent, largely on account of the bulky rice diet in general use.

The expenditure for the year was Rs. 51,119, of which Rs. 12,723 was met by donations, subscriptions, and offertories; Rs. 10,339 from fees; and Rs. 13,833 by remittances of funds collected in England. The hospital is entirely dependent on missionary and voluntary support, and no cause in India is more worthy of support—in view of both the past achievements and the splendid present work of the hospital.

The Kashmir State Leper Hospital is on a different footing, since its cost of maintenance (with the exception of a fund for comforts for patients) is borne by the Kashmir Durbar. In the report for 1926, Dr. Neve remarks that the "key to the leprosy problem is to save the children." At the close of the year there were 114 patients in the wards. On the whole, the anæsthetic cases are the more satisfactory to treat; after a certain number of years the disease tends to be self-limited, whilst the patient is non-infective. The tubercular type is more difficult to deal with, and is highly infective. Also it appears to be more resistant to treatment. Eye complications are prevalent—especially iritis. Blindness, beginning in the sclero-corneal tubercle, is the most serious of these complications. It is interesting to note that during the thirty odd years since the opening of the hospital no case of leprosy has occurred among any of the staff or servants; the infectivity of leprosy is certainly exaggerated in the popular belief. The one great essential is the segregation of the children of lepers, and in 1926 there were 17 healthy children, born of leper parents, segregated in the special home.

Dr. Neve is to be congratulated on a year of continued and successful hard work. It is impossible to overappraise the value of such a hospital as his; the educative, pioneer, and philanthropic range of its activities are widespread throughout the whole of Kashmir State.

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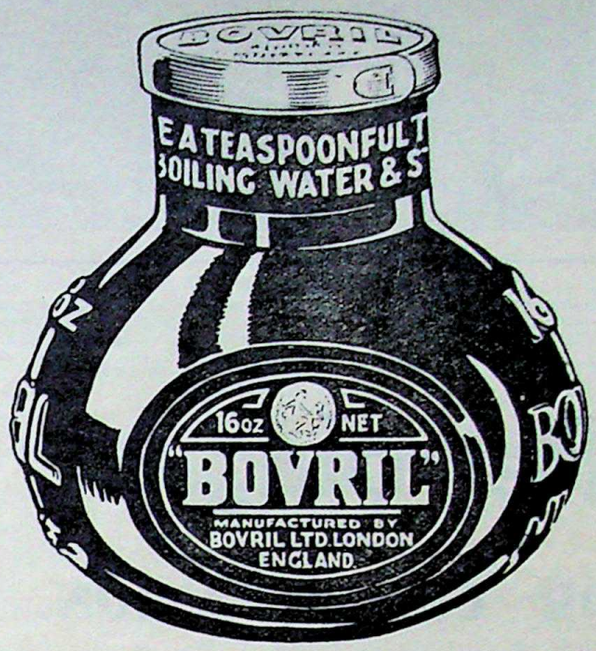

Averting Relapse

It frequently happens in critical stages of illness that a rapid restorative is needed in order to support a patient during a period of physical exhaustion. In such crises, the well-known restorative and stimulant powers of Bovril are of great value. Bovril is the concentrated essence of beef, containing its strengthening and its nutritive properties in a form immediately assimilable and rapidly effective.

BOVRIL

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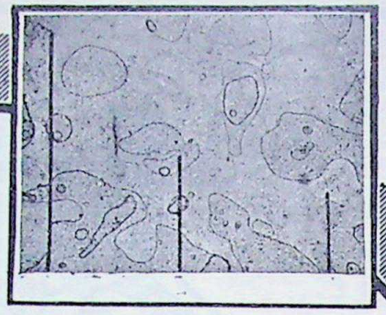
Micro-photograph of stool after Petrolagar administration, showing complete emulsification and thorough admixture with intestinal content.
(1) *Epithelial Cells,* (2) *Microscopic Oil Globule,* (3) *Agar-Agar Granule,* (4) *Faeces*



Micro-photograph of faeces after administration of plain mineral oil, showing complete absence of emulsification; this explains why mineral oil always leaks.
(1) *Epithelial Cells,* (2) *Oil Globule,* (3) *Faeces.*

Petrolagar

(DESHELL)

FOR CONSTIPATION.

THE micro - photographs clearly demonstrate the superiority of Petrolagar over ordinary liquid paraffin in the treatment of constipation. On the left the perfect admixture with the intestinal content obtained with Petrolagar is apparent; the other photograph, in which large unemulsified globules of oil are present, explains at a glance why plain mineral oil never has solved and never can solve the problem of constipation. It also shows why mineral oil leaks.

The drawbacks inseparable from the use of plain liquid medicinal paraffin are well known. Many patients cannot tolerate its insipidity; digestive disturbances sometimes occur; whilst thorough admixture with the intestinal content is seldom attained, with consequent leakage from the rectum.

Petrolagar contains 65% of purest mineral oil with a 10% Agar emulsifying agent, prepared from 1½% anhydrous agar, forming a perfectly stable, homogeneous and highly palatable emulsion.

There is no taste of oil, so that the most fastidious patients take the product readily. In the treatment of chronic constipation, Petrolagar gives results unobtainable by any other method and breaks the vicious circle set up by the habitual use of drastic purgatives. The medicinal paraffin is so finely divided that it is thoroughly disseminated throughout the fæcal mass, thus leakage is almost entirely eliminated; the agar-agar is specially prepared so as to yield on incubation in the intestinal tract many times its original bulk, forming a bland gelatinous mass which is completely and readily eliminated, acting indeed, as a soothing emollient to the inflamed intestinal mucosa.

As contrasted with cathartics, Petrolagar is non-habit forming, and once normal elimination has been restored may be given in diminishing quantity.

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Correspondence.

INTERMITTENT FEVER IN PNEUMONIA.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—About two weeks ago I was called to see a youth, 19 years of age, with a temperature of 102.5° F., pain in the left side of the chest near the base of the lung, and coughing. On examination, dulness and bronchial breathing were present, and the diagnosis of lobar pneumonia was made. The pulse at the time was 90 p. m.

Next morning the patient's temperature was 98.6° F., and the pulse rate 52. For the next six days the temperature was of the same type, viz., 102.5° F. in the evenings, and 98.5° F. in the mornings, with corresponding changes in the pulse rate. Crisis occurred on the seventh day, with profuse perspiration, and the temperature dropped to 96° F., with a pulse rate of 48. The patient made an uninterrupted recovery. The pulse rate to-day is 56 p. m.

The pulse: respiration rate throughout was as 2:1. A more detailed temperature chart could not be kept, owing to want of skilled attendance. Cases of lobar pneumonia with such a fluctuating temperature chart must surely be very uncommon.—Yours, etc.,

VENILAL N. MODI, M.B., B.S.

RAOPURA, LIMDAPOLE,
BARODA.
3rd May, 1927.

ASCARIS INFECTION AS A CAUSE OF ABDOMINAL COLIC.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—The publication in your issue for August 1926 of a case of infection with *Ascaris lumbricoides* simulating intestinal obstruction prompts me to send in details of the following case.

I was called in on the evening of the 23rd January, 1927 to see a female Mahommedan patient aged about 23 years. The history given was that three days previously she had suffered from abdominal colic in the lower part of the abdomen, and that the pain had gradually become so intense that she was writhing on the floor with it. Her cries were keeping the household awake, and none of them could get any sleep. She was married, but had had no children, and gave a history of dysmenorrhœa. She gave no history of roundworm infection, but was habitually constipated, and had had no motion for the previous two days.

I found the patient rolling on the floor, and crying out. The pulse and temperature were approximately normal, but the respiration hurried and shallow. She stated that the next menstrual period was due in about 8 days. A provisional diagnosis of uterine trouble was made, and I gave ¼ gr. of morphia to quieten her for the night, and a dose of calomel.

The next morning I was informed that she had passed three roundworms in the stool and had vomited two others. Santonin and calomel were now administered, and her condition steadily improved. By the 27th she was in good health. In all she passed 16 roundworms, and all symptoms of colic ceased.—Yours, etc.,

BHUPENDRA NARAYAN CHAKRABARTTY.

HAZI OSMAN GANI DISPENSARY,
ANGURSON,
PINDIRA P. O., BURDWAN DISTRICT.
15th April, 1927.

INTRAMUSCULAR SODIUM SALICYLATE IN LUMBAGO.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—I was consulted some time ago by an elderly man, 52 years of age, who gave a history of chronic pain in the right lumbar region of one or two months' duration. There was a family history of rheumatism, and no history of syphilitic infection. He had consulted sundry physicians, and *kavirajs,* but with no benefit. The pain had increased to such an extent that he could not turn in bed without assistance.

Examination showed no cause for the pain other than muscular, and a diagnosis of lumbago was made. I administered iodides and salicylates by the mouth for a week, but with no improvement. I then gave him an intramuscular injection of 1 c.c. of a 20 per cent. solution of (natural) sodium salicylate into the gluteal muscles. This greatly relieved the pain. A week later I gave a similar 2 c.c. injection of the same strength. The result was almost miraculous, for the patient was able to walk, and a week later was in normal health, with no pain.—Yours, etc.,

PRABHASH KUMAR SAHA, L.M.P.

KHAGRA, BERHAMPORE,
BENGAL.
24th April, 1927.

THE PRELIMINARY EXCITANT ACTION OF MORPHIA.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—In man, morphine in therapeutic doses, has a depressant action on the central nervous system, though in some animals it has a transient stimulant action—especially on the spinal cord. But even in animals this stimulant action is limited to the spinal cord; and the brain is depressed without any preliminary phase of stimulation.

I was therefore surprised when, some time ago, I gave a hypodermic injection of morphine sulphate, gr. ¼th, with atropine sulphate, gr. 1/100th, to a female patient suffering from gastric colic, and noted the preliminary stimulant action on the brain. I had hardly left the house more than twenty minutes when a messenger came with the alarming message that the patient "seemed as if possessed." I found her shouting and struggling, in great mental excitement, and held down by half a dozen persons. The messenger had not in any way exaggerated the patient's condition.

She did not complain of any pain, and the pupils were normal in size. Evidently the morphia had had a selective stimulant action on her brain. A hypodermic injection of hyoscine hydrobromide, gr. 1/100th, calmed her down within a short space of time.—Yours, etc.,

R. D. PAL, M.B.

TOUNGOO, BURMA.
15th April, 1927.

(*Note.*—The preliminary excitant action of morphine is well known, and varies very much with different individuals. Thus Whitla, in the 1923 edition of his *Pharmacy, Materia Medica and Therapeutics,* writes "The two effects produced by opium (and morphine)—cerebral *excitement* in the first instance, and *depression* or sleep afterwards—vary very much in different individuals, and also to some extent depend upon the way in which the drug is administered..... Most pharmacologists maintain that the action of the drug is depressant from the first, the apparent stimulation being due to a primary depression of the higher centres, whose inhibitory action being thus removed, the lower ones act without the normal restriction."—ED., *I. M. G.*)

THE TREATMENT OF TUBERCULOUS JOINTS.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—In your issue for last March, Dr. Khushi Ram of Ludhiana advocates operative treatment in early cases of tuberculous joints, and supports his line of treatment by quoting a case in which he operated successfully.

His statement is a sweeping one, and is contrary to the experience and teaching of modern surgery. Operative treatment is not a line of treatment to be

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universally adopted for early case of tuberculosis of the joints. The case which Dr. Kushi Ram describes was diagnosed as tuberculous, but it is not mentioned whether the diagnosis was made after an *x*-ray examination. In my opinion an *x*-ray examination is essential before we can accept a case of joint disease to be definitely tuberculous, especially if the case is to be made a basis for a complete alteration of our methods of treatment.

I think that I side with the majority of surgeons when I state that my experience as House Surgeon at King George's Hospital, Lucknow, has been quite contrary to Dr. Ram's teaching. Proper splinting and good hygiene in the treatment of such cases are gaining ground every day, and not without reason.

As Dr. Ram's letter has appeared in a responsible medical journal, I feel that the other side of the case should be presented in your columns.—Yours, etc.,

R. N. TANDON, B.SC., M.B., B.S.

C/o THE AGENT, BENARES BANK, LTD.,
SAHARANPUR, U. P.

(*Note.*—We are not of course responsible for the opinions of our correspondents, but Dr. Tandon's contention is certainly right. In the 1924 edition of Rose and Carless' *Surgery* the treatment emphasised for early cases is absolute rest, splinting, and plaster of Paris. In the *Medical Annual* for 1927 will be found an account of the brilliant results secured in such cases by phototherapy at the Treloar Home for Cripples at Alton, illustrated by most interesting photographs. Rose and Carless give the indications for excision as follows: (1) for complete disorganization of the joint; (2) to determine a rapid and radical cure with synostosis in such a joint as the knee, as soon as it is evident that the natural result of the disease must be an ankylosed limb; (3) to prevent ankylosis in certain joints, such as the elbow and temporo-maxillary; and (4) deformity with or without ankylosis may justify excision.—ED., *I.M.G.*).

THE TREATMENT OF MYIASIS.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—On reading the account of a case of myiasis in your issue for last April, I am prompted to send in the following notes on the condition.

Cases generally occur at the close of the rainy season. Last year at that time of the year I saw seven cases, six of them being children, and the seventh an adult female patient. In two cases the nose was affected, in two the ear, and in two ulcers of the leg were infected. The seventh case was the adult female patient, who had pneumonia, and in her case the mouth was affected.

The solution which I used in treatment consisted of one drachm each of chloroform, carbolic acid, creasote, and ol. terebinthinæ. The affected part is first cleaned up with a lotion prepared from the above solution, and the solution itself is then applied on a cotton wool plug. This gives admirable results. I now make it a practice also to syringe the nose or ear of a child who comes with a history of bleeding from either cavity, but with no apparent cause. Some of such cases turn out to be cases of myiasis.—Yours, etc.,

M. M. DAVE, L.C.P.S.

MOGALKOT, NADIAD.
20th April, 1927.

Service Notes.

APPOINTMENTS AND TRANSFERS.

Lieutenant-Colonel F. E. Wilson, I.M.S., an Agency Surgeon on return from leave, is posted as Civil Surgeon, Quetta, with effect from the 9th April, 1927.

Lieutenant-Colonel G. D. Franklin, O.B.E., I.M.S., assumed collateral charge of the duties of Civil Surgeon, New Delhi, with effect from the forenoon of the 11th April, 1927, relieving Major J. P. Huban, O.B.E., I.M.S., granted leave.

The following officers of the Indian Medical Service are appointed substantively to be Agency Surgeons under the Government of India in the Foreign and Political Department, with effect from the dates noted against their names:—

Major R. F. D. MacGregor, M.C., I.M.S. Dated 29th March, 1927.

Major C. J. Stocker, M.C., I.M.S. Dated 1st April, 1927.

Major J. B. Hance, O.B.E., I.M.S. Dated 1st April, 1927.

Major E. S. Goss, M.C., I.M.S., on return from leave has been appointed as Officer-in-charge, Medical Store Depôt, Lahore Cantt., with effect from the 17th April, 1927 (forenoon).

The services of Captain S. L. Mitra, M.B., D.T.M. & H. (Edin.), D.P.H. (Edin.), I.M.S., are placed permanently at the disposal of the Government of Bihar and Orissa, with effect from the 5th September, 1925.

LEAVE.

Lieutenant-Colonel J. Anderson, I.M.S., an Agency Surgeon is granted leave on average pay for 6 months under the Fundamental Rules, with effect from the 21st April, 1927.

Major J. C. De, I.M.S., Police Surgeon, Calcutta, is granted leave for 6 weeks, with effect from the 25th April, 1927.

Major J. P. Huban, O.B.E., I.M.S., Civil Surgeon, New Delhi, is granted leave on average pay for 6 months, under the Fundamental Rules, with effect from the forenoon of the 11th April, 1927.

Captain A. C. Chatterjee, I.M.S., is appointed to act as Police Surgeon, Calcutta, during the absence, on leave, of Major J. C. De, I.M.S.

PROMOTIONS.

Colonel to be Major-General.

Colonel Godfrey Tate, M.B., V.H.S., *vice* Major-General R. Heard, C.I.E., M.D., K.H.S. Dated 27th February, 1927.

Lieutenant-Colonels to be Colonels.

R. F. Baird, *vice* Colonel G. Tate, M.B., V.H.S. Dated 27th February, 1927.

G. Hutcheson, M.B., *vice* Colonel C. H. Bensley, C.I.E., K.H.P. Dated 15th February, 1927.

Captains to be Majors.

M. L. Dhawan, M.B. Dated 28th April, 1927.

Charles James Lodge Patch, M.C. Dated 19th May, 1927.

J. D. L. Yule, M.B. Dated 8th April, 1927.

Lieutenants to be Captains.

Hugh Waddell Mulligan, M.B. Dated 29th November, 1926.

J. E. Gray, M.B. Dated 8th January, 1927.

RETIREMENTS.

Lieutenant-Colonel S. Hunt, M.B. Dated 29th March, 1927.

Lieutenant-Colonel E. D. Greig, C.I.E., M.D. Dated 1st April, 1927.

Lieutenant-Colonel J. G. P. Murray, M.D., F.R.C.S.E. 24th March, 1927.

Lieutenant-Colonel R. M. Carter, C.B., F.R.C.S. Dated 21st March 1927.

NOTES.

EPHEDRINE.

EPHEDRINE is the alkaloid of *Ephedra vulgaris* var. *helvetica*, and its hydrochloride has been introduced as a substitute for atropine in general medical and ophthalmological practice. The British Drug Houses, Ltd., 16-30, Graham Street, City Road, London, N 1, have recently introduced this drug for the preventive treatment of asthma and prophylactically for the

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PLURIGLANDULAR Therapy is the most rational method of treating functional sterility.

A great deal of clinical experience during the last ten years proves that not merely are abnormal menses regulated and the psychic and neurotic manifestations controlled, but that the sterility is cured.

One case of ovarian insufficiency in whom menstruation had been absent for six years recently has completed a normal pregnancy. The only treatment used was

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treatment of low blood pressure in pneumonia. They are now manufacturing pure ephedrine hydrochloride on a commercial scale from Chinese supplies of *Ephedra vulgaris*. The drug can be obtained in tablets for oral administration, also in solution in vials for hypodermic use. It is especially in cases of asthma that its use is indicated, either orally or hypodermically.

ARTIFICIAL COOLING.

From time to time it becomes evident that engineers in the tropics are giving their attention to the problem of cooling air in living rooms, factories and the like.

In this connection an extremely interesting plant is that manufactured by the well-known Carrier Engineering Company, Ltd., who maintain a branch office at Exchange Building, Bombay.

Broadly speaking, there are two methods of dehumidifying air. The first system is by exposure to hygroscopic substances. The difficulties attendant on this method appear to render it impracticable of application to the problem of cooling rooms; while air may be dried by this method, the mere fact that the hygroscopic material absorbs moisture involves the liberation of latent heat rendered sensible by this absorption. Thus the air, though dried, must become increased in temperature with the result that the building under consideration becomes heated and not cooled.

The second method is to lower the temperature of the air by exposing it to cooled surfaces either by contact with an artificially cooled surface, or by passing it through an artificially cooled liquid wherein its water vapour can be to a large extent, deposited.

Of these two latter alternatives the first has already been applied to the cooling of rooms in the tropics and may be seen in daily operation at the Calcutta School of Tropical Medicine.

This method, however, is difficult to regulate and the frosting of pipes is a serious objection.

With the Carrier Dehumidifying System, the second alternative has been adopted. Air, from both outside and inside the room, is drawn into the equipment through a series of dampers which control the relative proportions. It is then passed through the dehumidifier which consists of a chamber containing a series of nozzles through which artificially cooled water is forced in such a manner as to form an exceedingly fine spray. Thus the air passing through this chamber comes into intimate contact with finely atomized water and is immediately cooled to the water temperature and deposits, as a liquid, the now condensed water vapour.

It is drawn out of the Dehumidifier Chamber by means of a fan, but, prior to leaving, the air passes through specially designed eliminator plates which retain any moisture in the form of droplets, permitting only 'dry' air, saturated at the water temperature, to be discharged into the room being dealt with.

The air leaving this machine has thus a dew-point depending only upon the temperature at which the water in the apparatus is maintained and this, of course, can be made as low as may be desired by refrigerating apparatus.

After leaving the fan, the cooled air is drawn through a system of distributing ducts to any part of the building dealt with. These rooms constitute enlargements, as it were, of the duct system.

It is claimed for this method of cooling and dehumidification that it admits of the most accurate degree of adjustment of both the temperature and the humidity of the air admitted to any room, factory or building. Should heating be desired, the air can, of course, be readily warmed before admission to the room. Furthermore, if desired, the water spray can be treated with disinfectants, etc.

The rooms so cooled, heated or medicated, require no insulation from external heat though, naturally, the more heat-resisting the building may be, the less the cost of the necessary equipment.

In a brochure describing this machinery, its many uses are fully illustrated. For instance, it has been applied to works where time fuses for shells are made. Such work should, or course, be carried out under constant conditions of temperature and humidity, and we understand that the Government of India has lately erected a large plant on these lines at the Ammunition Factory at Kirkee.

It has also been largely used in the cinematograph industry in America in the improvement of the manufacture of films and all large American cinematograph theatres are artificially cooled by this system during the hot weather. Several London theatres are also installing this equipment. Bakeries, sweetmeat factories, electrical and mechanical works and even a Masonic Temple are quoted as examples of the spheres in which such plant is used.

The equipment is exceedingly ingenious and obviously has a wide range of utility and one cannot avoid thinking of its possible application to tea factories, cinematograph theatres, hotels and business offices in this country, above all of its possible application to surgical operating theatres and to special wards.

The address of the Carrier Engineering Co. is Exchange Building, Ballard Estate, Bombay. In Calcutta, H. Rolfe & Co., 8, Dalhousie Square, P. O. Box 186, can also supply particulars.

'WELLCOME' BRAND INSULIN.

WITH the approval of the Medical Research Council, Burroughs Wellcome and Co., are now prepared to supply 'Wellcome' brand insulin, 200 units in 5 c.c., in addition to the regular strength of 100 units in 5 c.c.

The increased concentration now available will no doubt be greatly appreciated by medical men who have patients requiring a high unit dose.

To avoid the possible risk of overdosage the 40 units per c.c. strength is issued with a label and in a carton of a distinctive colour entirely different from the colour of the label and the carton used for the 20 units per c.c. strength.

The list prices in Bombay are as follows:—

100 units in 5 c.c.	.. Rs. 2 14 0
200 units in 5 c.c.	.. Rs. 5 12 0

Dr. J. P. Bose, Mitra Research Scholar, Calcutta School of Tropical Medicine, kindly tested a sample sent of the 40 units per c.c. strength by rabbit inoculation, and reports that it was found to comply with the standard laid down by the Medical Research Council.

STOVARSOL.

A RECENT brochure issued by Messrs. May and Baker, Ltd. (to the medical profession only) deals with further reports on the use of Stovarsol for different diseases. Chemically, Stovarsol is acetyl-oxy-amino-phenyl-arsenic acid, and is a white powder, practically insoluble in water. It is put up in bottles of 28 tablets, each of 4 grain strength. The real merit of Stovarsol appears to lie in its high organic arsenic content (27.2 per cent.) plus its very low toxicity. The dosage of four of the 4-grain tablets a day recommended by some of the French workers is rather apt to induce diarrhœa, but a dosage of two of the tablets a day—one in the morning and one in the evening—can be taken for ten days with complete tolerance.

In amœbiasis Marchoux has claimed the most remarkable results with it in 59 cases of amœbic dysentery, clinical cure being brought about in 57 of the cases. Cade and Ravaut's report is more interesting in that they followed up the case by after-treatment examination of the stools. This concerns a patient who had suffered from chronic amœbic dysentery for 2½ years, and had had repeated treatments of different kinds, without cure. A course of 2 tablets daily for 8 days effected complete cure, and examination of the fæces after treatment failed to show any forms of *Entamœba histolytica*. Garin reports a further case of infection with *Entamœba histolytica, Giardia intestinalis* and *Trichomonas hominis* in the same patient. After Stovarsol treatment

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examination of the stools on 14 occasions gave negative findings for all three parasites, but three weeks later there was a relapse of the dysentery. Johns and Jamison report on the treatment of 46 cases with good results; nearly half of the patients were kept under observation after treatment, and their fæces were examined with negative findings.

(The reviewer has been steadily collecting observations on different lines of treatment of amœbiasis during the last five years, and hopes shortly to have figures for publication. The crucial difficulty in such cases is that Indian patients will not stay in hospital after treatment long enough for the eight or more after-treatment examinations of the stools which are essential to test whether the infection has been eradicated or merely scotched. Hence observations have to be collected chiefly in connection with European patients. One may, however, make two remarks with regard to Stovarsol. Firstly that there are certain cases of chronic amœbic dysentery, where repeated but irregular courses of emetine have reduced the patient's general bodily resistance to a marked degree, but have failed to eradicate the amœbic infection. It is precisely in this class of case that Stovarsol is very useful; the clinical condition immediately improves; whilst after-treatment examination of the stools frequently gives negative findings. Secondly, Stovarsol is an excellent *adjuvant* in treatment after a systematic course of emetine and bismuth administration; it improves the patient's general condition rapidly, and appears to be a good hæmatinic.)

Petzetakis claims that Stovarsol is an effective prophylactic against amœbic infection. In yaws, Tanon and Jamot report on an extensive series of cases treated in the Cameroons. They consider that Stovarsol is at least as effective as the arseno-benzene derivatives, and pleasanter to take. The lesions heal within ten days, leaving only a blackish stain which fades in another five days. van den Branden in the Belgian Congo, and Massias from Cochin-China also speak very highly of its value. Baermann inoculated a European volunteer with material from a yaws lesion in a Javanese patient full of *Treponema pertenue*. Stovarsol prophylactic treatment was immediately instituted, and the inoculation failed to take.

In relapsing fever Jamot found that spirochætes disappeared from the blood in 18 out of 20 cases treated, within 6 to 30 hours of taking the initial dose. Beal records the successful use of a suspension of 16 grains of Stovarsol in 10 grammes of glycerine as a local treatment for pyorrhœa alveolaris. Vincent's angina and phagedenic ulcer are other conditions where good results are reported. In the latter condition Stovarsol was used as a dusting powder after cleansing the ulcers.

The drug is certainly one which has come to stay. It is very easily taken (and very well tolerated if a dosage of one tablet twice a day be not exceeded); it is suitable in *pro rata* dose for children; it is free from the depressant effects of emetine, and of value as a hæmatinic, owing to its high arsenic content. Finally, Messrs. May and Baker's reports are strictly ethical and their circulars, etc., are issued only to the medical profession.

OGILVY'S CATALOGUE OF SHOP-SOILED AND SECOND-HAND MICROSCOPES.

WE have lately received Messrs. Ogilvy and Co.'s April 1927 catalogue of shop-soiled and second-hand microscopes and microscopic apparatus and have studied it with much interest. The firm has a very high reputation; not only are they the British agents for Leitz and Co.; they are also makers of high-grade microscopic illuminating apparatus and microscopic accessories, and their workmanship is of high quality.

The list is one which anyone contemplating the purchase of a microscope or of microscopic accessories would do well to study. Amongst the microscopes listed, the Leitz binocular stand CB, with one pair of eye-pieces (but no objectives) at £24-10-0 is excellent value. A number of Greenhough binocular dissecting microscopes at cheap rates are also listed. A Leitz apochromat. 2 mm. oil immersion objective at £13-15-0 should be very good value. Microscope accessories, shop-soiled hæmacytometers, microtomes, photomicrographic apparatus, electric microscope lamps, photographic apparatus, field glasses, and projection apparatus are also included.

Those who are in charge of pathological, histological, and bacteriological laboratories would do well to write for the catalogue. The address of the firm is Messrs. Ogilvy and Co., 20, Mortimer Street, London, W. 1.

ANÆSTHESIA PER RECTUM.

WE have lately received from the Havero Trading Co., 18, Clive Street, Calcutta—the Indian agents of the I. G. Farbenindustrie Actiengesellschaft—a report of the recent discovery by the latter firm of what is stated to be a suitable general anæsthetic for administration per rectum. The I. G. Farbenindustrie Actiengesellschaft are the manufacturers of Plasmoquine, and are a well known and leading firm of German chemists. At the recent German Surgical Congress at Berlin it was announced that the new rectal anæsthetic had been elaborated, but its composition has not yet been published. It is stated that in many cases the new anæsthetic can be administered in a single dose by enema, no further administration being necessary. Rectal anæsthesia would of course be of special advantage for facial and throat operations. Records of approximately 2,000 experimental administrations were reviewed and it was stated that the method is especially free from unpleasant after-effects, such as vomiting and pulmonary trouble. Further, the degree of anæsthesia produced is a prolonged one, permitting the surgeon to take his time.

On the other hand, the report speaks of certain "by-effects," the nature of which is not stated. Rectal anæsthesia has always been an attractive idea. But we agree with the firm that "as a matter of principle the German chemico-pharmaceutical industry should not put forward to the medical profession any remedy which has not been clearly proved to be unobjectionable in its method of action, as tested by experiments which may sometimes have to be carried out over a period of years." If the ideal anæsthetic for administration per rectum has been discovered, we are certain that we shall hear more about it in the future.

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Original Articles.

TINEA CRURIS: ITS MANIFESTATIONS, DIAGNOSIS AND TREATMENT.

By HUGH W. ACTON,

LIEUT.-COL., I.M.S.,

In-charge of the Skin Department,

and

C. McGUIRE, M.B., D.T.M. (Bengal),

School of Tropical Medicine and Hygiene, Calcutta.

MANY medical men in India do not recognise the manifestations of ringworm of the groin (*Tinea cruris*) if it attacks other parts of the body. We have had practitioners with many years of experience in tropical diseases coming to us with such common complaints as *mangoe toe,* and foot-tethers and asking us to diagnose the nature of the lesion, and advise them about its treatment. Some of these manifestations of *Tinea cruris* are illustrated in the leading text-books as gouty eczema, etc., whilst it is only in recent years that the lesion named cheiropompholyx—thought to be due to an error of sweat secretion—has now been proved to be due to ringworm. Again, many of the eczema lesions pictured in text-books on skin diseases are nothing more than primary ringworm infections with secondary streptococcal dermatitis. Castellani in Byam and Archibald's *Practice of Medicine in the Tropics* points out that two of these manifestations of *Tinea cruris*, viz., dermatitis interdigitalis, and dermatitis bullosa plantaris, are due to streptococcal infections secondary to ringworm. Under these circumstances it is not surprising that many mistakes in diagnosis have been made in this common parasitic infection of the skin.

The first difficulty hitherto has been to identify the ringworm fungus in the lesions. One must do more than merely scrape the skin surface and examine the scales under caustic potash; when the mycelial rods are few in number, a thick piece must be taken from the advancing edge and cleared for several hours in 40 per cent. caustic potash before the fungus can be seen under the microscope. When vesicles are forming, the serum inhibits the growth of this fungus, so it is necessary to take off the tops of several vesicles; sometimes as many as 16 pieces have to be examined after prolonged clearing, and then the mycelium may be seen in one or more of these epithelial flakes. In quiescent cases, the spores are very few in number, so one has to resort to cultivation on special media. Cultivation is difficult as it is necessary to get rid of the secondary organisms, and numerous inseminations have to be made before a successful culture takes place on the media. Success in cultivation depends to a large extent on the cleanliness of the skin surface, because other fungi and spore forming bacteria may be present that are impossible to destroy without killing the ringworm fungus. Many of the cases can therefore be more easily diagnosed clinically as ringworm, e.g., cheiropompholyx, ringworm of the feet, etc., for to prove them to be such by bacteriological methods may require a number of trial examinations and cultivations before one is successful.

The second difficulty has been due to insufficient knowledge of the morphology and lesions produced by this fungus. The ringworm that produces these lesions is a higher fungus consisting of roots, surface runners, and aerial hyphæ that carry (spores) end organs. The roots penetrate the basal cell layer as far as the papillæ, and open the lymph spaces, producing vesicles, bullæ, or exfoliation of the skin, depending on its thickness. The serum in turn inhibits most bacteria except streptococci and staphylococci, so that streptococcal dermatitis (eczema) and pustules (cheiropompholyx) are common secondary infections of *Tinea cruris.* Often when the case is first seen, the condition is diagnosed as eczema, etc. but as the inflammation subsides, the ringworm character of the lesion becomes evident. We have abandoned the term eczema from our nomenclature of skin diseases and speak of these cases as streptococcal dermatitis. In our skin clinic, the commonest form of streptococcal dermatitis which we see is that secondary to *Tinea cruris* infection.

The lesions we are about to describe cause a great deal of discomfort and disability in the following ways:—

(*i*) Pruritus, owing to irritation of the basal cell layer by vesicles forming, or denudation of the protective surface layer.

(*ii*) In the dry hot weather, the infected skin becomes hard and dry, and with movement cracks and fissures, causing pain.

(*iii*) Streptococcal infection of the corium; this is a more serious complication producing a localised dermatitis or extending cellulitis.

It is not generally recognised that *Tinea cruris* attacks the feet more commonly than the groin, and that moisture and friction are essential to allow the ringworm fungus to grow on the skin and penetrate through the horny protective layer.

Lastly, the treatment of these conditions is extremely confusing to the practitioner, for some recommend one line of treatment and others another. The reason is, that none of the writers pay any attention to *the nidus of the disease* that is frequently found between the 4th and 5th toes; or to the danger of re-infection that occurs after the remedy has been stopped from being applied to the skin.

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Aetiology.

The essential cause of the disease is an infection of the epidermis by the cryptogamic fungus known as the *Tinea cruris* or *Epidermophyton inguinale*. This form of ringworm, although highly infectious, requires certain conditions of soil, temperature, etc., before it can invade the surface epithelium. The infection takes place from man to man by spores reaching the body through the handling of clothes, etc. The dhobi has generally been incriminated as the means by which the disease is spread, but it is very doubtful if he is the only culprit. Most Indian servants have some form of this infection present on their body, and by handling clean clothes are more apt to transmit the disease. During the last 6 years one of us had a bearer who has suffered from *Tinea cruris* of the nails, and if during the hot weather one neglected to take precautions to prevent infection, one would invariably have got an attack of ringworm of the groin. This is not the only method of infection, as we have evidence that this ringworm fungus can grow on moist soil. In this way the feet are often infected in those who walk barefooted on moist soil, such as the Indian maid-servant, and those who frequent public swimming baths. In persons affected with ringworm of the groin, the infected scales falling down from the groin may lodge between the toes, or infect the ground and then in turn infect the toes.

As regards the conditions necessary for infection, the first point one notices is that this fungus invariably chooses those sites of the body where the epidermis is finest in texture and consists of only two layers, a single-celled basal layer and a horny layer which is only three or four cells in depth. These areas of fine skin are found in the inner side of the groin, about the web of the fingers, toes, axilla, inner side of the wrist and about the tendo Achillis. Children are not usually attacked, and some dermatologists consider this is due to thymic function which allows the microsporon to attack the hairs of the head, but prevents the body skin surface from being invaded by *Tinea cruris*. In adults when the thymus disappears, the body is attacked by *Tinea cruris* but not the hair of the head by microsporon, as the soil is unsuitable. The facts hold good, whether the explanation is right or wrong.

The second point that is observed is that certain conditions are necessary for infection to take place on the body; they relate to moisture, temperature and friction.

Tinea cruris requires a good deal of *surface moisture*, as will be seen from the following facts. Ringworm of the groin is a disease seen almost exclusively in men, and particularly in stout men with sedentary habits. During the hot weather in such individuals the skin in the folds of the groin is invariably in a sodden state. We have only seen the disease twice affecting the groin in women, both of whom were very stout. The disease occurs most commonly on the skin at the cleft between the 4th and 5th toes and is particularly common in those who wear ill-fitting shoes and thick socks. In Indian maid-servants who are continually walking barefooted on damp ground in and about their kitchens the disease is very prevalent.

Friction is also a very fruitful cause in allowing infection of the skin to occur, as the protective horny layer of the skin is rubbed away by the rubbing of coarse wearing apparel, or by continually washing, as in certain trades like washerwomen, nurses and doctors. In the latter class of people, the lesions are frequently seen at the web of the fingers and may spread to the palms. In Bengalees who do not wear socks but only Oxford shoes, they generally get infected on the instep at the site where the tongue and edge of the shoe rubs most. Durwans (gate-keepers) who wear *kharams* (i.e., wooden shoes with a peg which is held between the first and second toes) are usually infected at the first cleft between the great and second toes. In some, owing to the friction of the *dhoti* (loin cloth) in men, and the *sari* in women, the ringworm affects the skin in that area which is subjected to the most friction and moisture. The soles of the feet are particularly affected in those who suffer from flat feet or a tendency to flattening of the arch, and the disease is therefore seen more commonly amongst those who walk barefooted on damp ground, and in Europeans, who wear thick socks and boots. Infection may occur on the thin skin which is situated on either side of the tendo Achillis in Europeans under similar conditions as above. Thus it will be seen that the two most important conditions that are necessary for infection are moisture and friction. The temperature of the air helps in raising the surface temperature of the body and increasing moisture. The disease during the winter months often remains dormant and the only sign then visible is desquamation of the skin surface, but there is nearly always some itching at the site of the disease. It is for this reason that the ringworm disappears on a change to the hills or to a cooler climate like England only to reappear again as soon as the sufferer returns to the plains, or when he leaves Suez and again comes into the tropics. It will be seen that the skin of the cleft between the 4th and 5th toes forms the most suitable place for infection to occur, as the spores are readily picked up from the ground by walking barefooted; the skin is suitable in texture, and moisture and friction occur most at this site. Therefore, the condition known as *mangoe toe* is in the majority of cases *the nidus of the disease*, and when the atmospheric temperature conditions become

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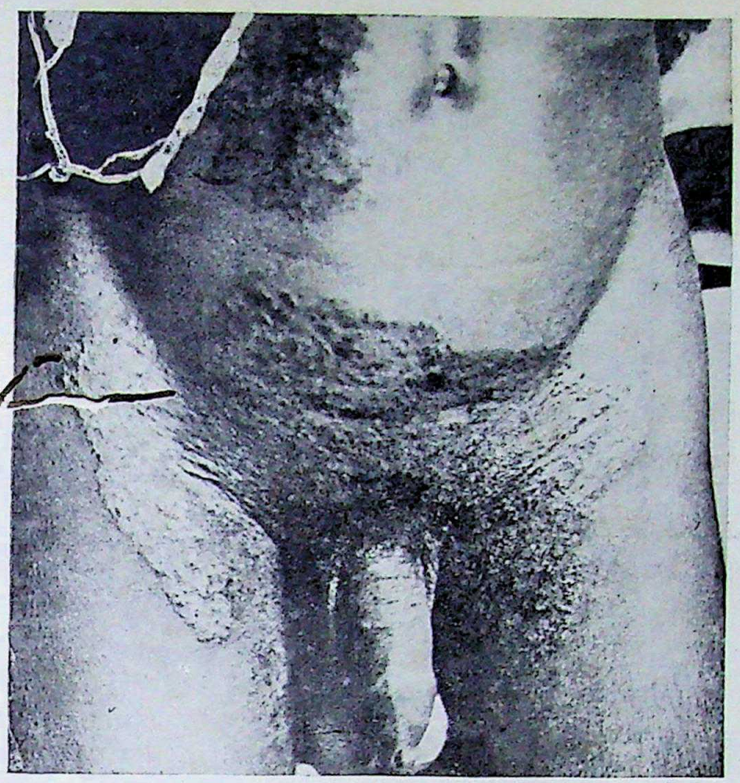
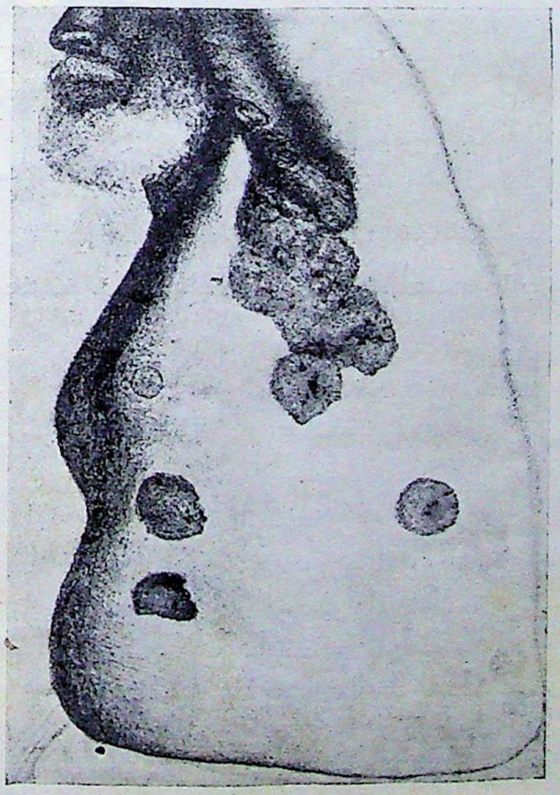
PLATE I.

The lesions produced by Tinea cruris *on the body.*



(*a*) *Tinea cruris* of the groin, a chronic case with marked hyperkeratosis.

(*b*) *Tinea cruris* of the body due to the friction and moisture caused by the dhoti.



(*c*) *Tinea cruris* of the axilla and body in a European. The lesions are red and angry looking.

(*d*) Extensive ring-worm infection of the body commonly seen in Ooriahs and boatmen.

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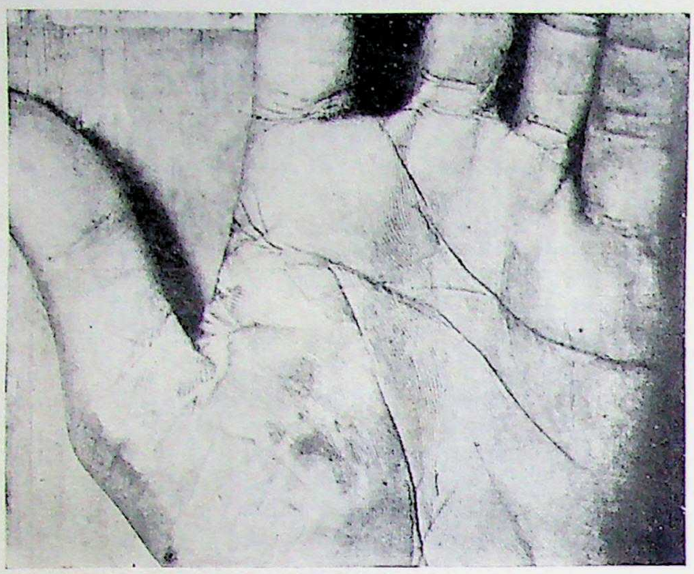
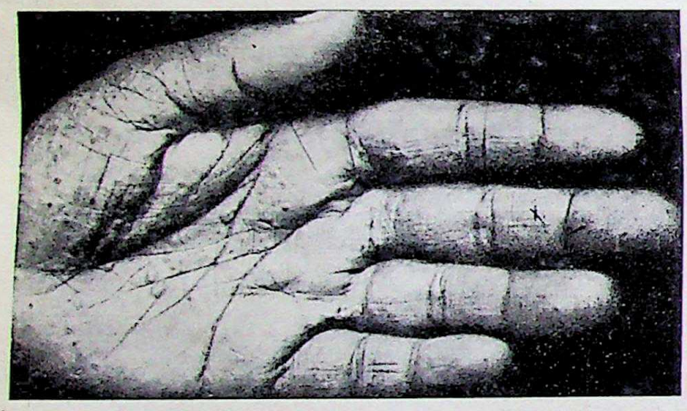
PLATE II.

The lesions produced by Tinea cruris *on the hands.*



(*a*) The plaque type with thickening of the epidermis (horny layer).

(*b*) Papular pustular lesions on the back of the hand, extension from the wrist.



(*c*) Small vesicles produced in the skin of the palm—vesicles sterile.

(*d*) Eczematous lesions between the web of the fingers.

(*e*) Cheiropompholyx. The vesicles have been

(*f*) Thickening of the skin of the palms (H

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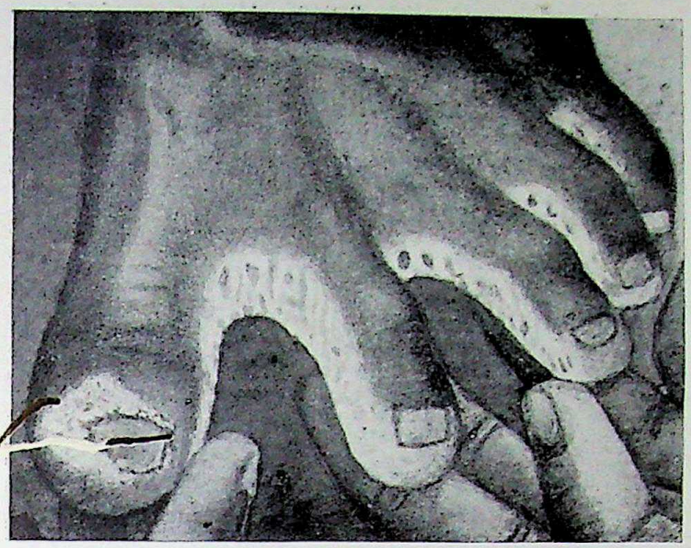
PLATE III.

The lesions produced by Tinea cruris *on the feet.*

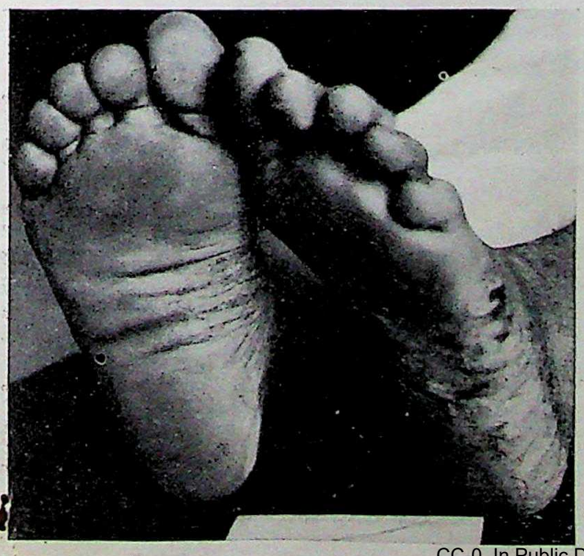


(*a*) Mangoe toe—extensive case—affecting all the clefts between the toes—Note the sodden appearance of the skin.

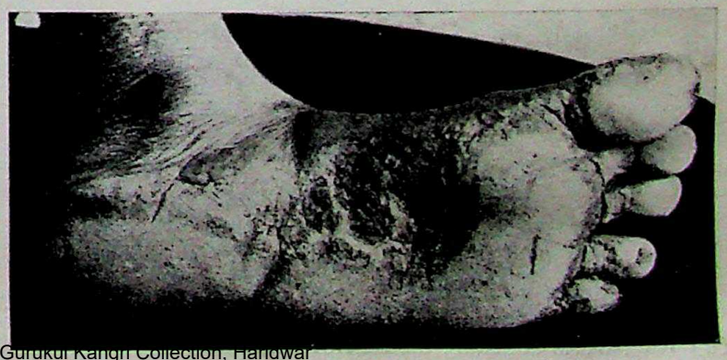
(*b*) Ring-worm lesions on the instep due to the rub of the shoes.

(*c*) Foot-tethers—plaque-like lesions on the sole with pustulation.

(*d*) Hyperkeratosis of the soles with extensive fissuring of the skin.



(*e*) Ring-worm of the soles of the feet, due to [illegible] from the thin skin on the inner and



(*f*) Mangoe toe with extension on to the soles of the feet with marked hyperkeratosis and fissuring

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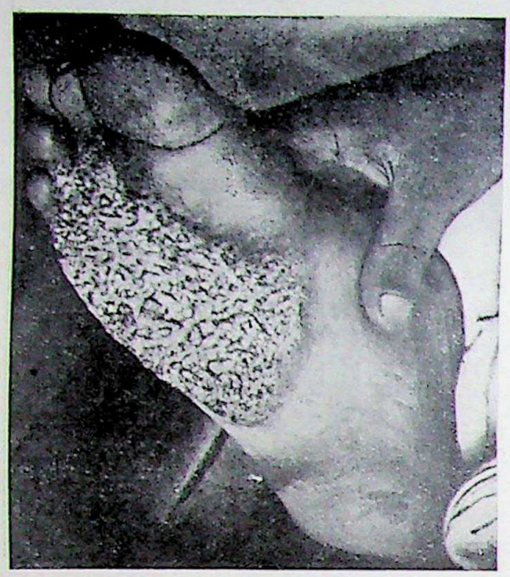
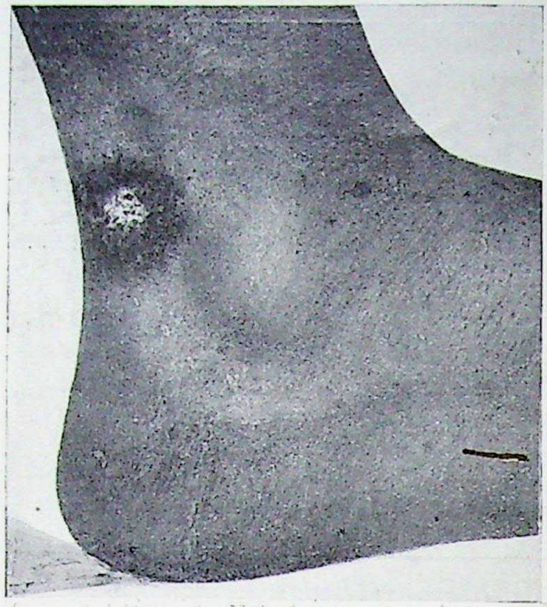
PLATE IV.

Tinea cruris *of the nails, and some common complications of* Tinea cruris.



(*a*) Verrucose tuberculide secondary to foot-tethers.



(*b*) Small patch of streptococcal dermatitis (eczema) on the thin skin around the ankle secondary to ring-worm.

(*c*) Ring-worm attacking the ends of the nails.

(*d*) Ring-worm attacking the base of the nails.

(*e*) Generalised streptococcal dermatitis secondary to *Tinea cruris.*

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favourable, and moisture on the body is abundant, spores can then easily gain access to other parts of the body during bathing or when drying oneself with an infected towel.

Clinical Manifestations.

By text-book descriptions one is led to believe that the commonest site of infection with *Tinea cruris* is in the groin. Here it is seen as a red area on the inner side of the groin with festooned edges, spreading more in the lower and posterior part than on the upper and anterior part, owing to the apposition of the scrotum. This lesion was first described as the marginal eczema of Hebra. In the acute stage the surface is red and raw, owing to the exfoliation of the horny layer leaving the tops of the papillæ bare; at this stage there is generally some oozing of serum. If one examines the growing edge, one sees numerous tiny vesicles which soon lose their horny caps and form deep red inflamed areas. As the condition subsides, the redness disappears and the skin in the groin has a slightly brown colour with surface desquamation. When dormant during the winter months, the staining of the groin is the only thing noticeable. In Indians who have had the disease for a long time and who have not been treated, the surface epithelium becomes thickened and sodden as is seen in Plate I, fig. *a*. Sometimes the disease extends on to the scrotum when the irritation is intense. Usually in these cases there is a superadded streptococcal infection. The disease may also spread to the anal fold and round the anus. In this area sometimes the disease persists when the lesions have cleared up from the groin, and the only symptom that is present is intense itching (pruritus ani). Ringworm of the groin is rarely seen in women, but occasionally in elderly women it attacks the fold between the labia majora or minora. On clinical examination there is no evidence of ringworm except that there may be lesions produced by scratching.

The feet is the commonest site for the ringworm to attack and the site usually infected is the cleft between the 4th and 5th toes. The lesion is popularly known as *mangoe toe* (*see* Plate III, fig. *a*) because it is commonly seen in the very hot season with the ripening of the mangoe. In the dormant state, the only sign seen is the thickening of the skin on the outer side of the interdigital cleft as a small area of thick white sodden skin. From this area the disease frequently spreads to the under surface of the margins of the toes forming thick cornified ridges (*see* Plate III, figs. *d* and *f*). During the hot weather, serum is frequently exuded under this thickened skin, and the lesion becomes very irritable causing the patient to peel off the top of the bleb. As a result, the basal cell layer is exposed and acute streptococcal infections are likely to occur, such as cellulitis. The fungus may also attack the inner side of the arch (*see* Plate III, fig. *e*), and gradually extends towards the under surface of the arch. The disease may extend either from the toe or from the arch to the under surface of the foot and cause two types of lesions.

(1) Plaques of thickened irritable skin, such as one seen in Plate III, figs. *e* and *f*; or (2) the fungus may penetrate deep down and produce vesicles which in turn may become infected by staphylococci, giving rise to pustules (*see* Plate III, fig. *c*), a condition which Cantlie described as foot-tethers. On rupture of the pustules, irregular suppurating areas are formed on the skin at the tread of the feet causing a worm-eaten appearance of the skin. In persons who are continually walking on damp ground and suffering from ringworm of the feet, the skin of the soles is liable to become very much thickened and on movement deep cracks appear which extend right down to the prickle cell layer; these fissures are very painful on walking, and are very difficult to treat (*see* Plate III, fig. *d*). In Bengalees owing to the friction of the shoes at the instep, a plaque of thickened skin is formed which is intensely irritable, and owing to the lack of elasticity the skin is very likely to fissure (*see* Plate III, fig. *b*). In Europeans who wear thick socks and boots, infection of the fine skin is also likely to occur on either side of the tendo Achillis; during the hot weather the lesion is seen as an eczematous patch (*see* Plate IV, fig. *b*); in the winter months a darker stained area of the skin is left with slight desquamation, which reappears in the following hot weather as a weeping eczema.

Infection of the hands is most commonly seen at the inter-digital clefts (*see* Plate II, fig. *d*) in persons who subject the skin to maceration by steeping in water or by continued washing. The lesions appear as minute vesicles containing serum, which are intensely irritable. The tops of the vesicles are soon scratched off and become infected by streptococci; the skin now becomes more irritable, the corium becomes indurated, serum oozes on the surface making it impossible for these people to carry on their profession. Sometimes the fungus attacks the palms of the hands by the roots being pushed out from the inter-digital clefts or from the thin skin of the inner side of the wrists. The lesions of the palm vary according to whether the roots penetrate the prickle cell layer rapidly or slowly. If the roots penetrate slowly, only sufficient serum is exuded between the prickle cell layer and the horny layer to irritate the cells and cause hyperplasia of this layer with heaping up of the epithelium, so that plaques are formed consisting of imperfectly keratinised horny cells which are twice the normal thickness, so that they are raised above the general surface (*see* Plate II, fig. *a*).

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Sometimes the disease is more extensive and there is a general thickening of the whole of the horny layer of the palm which becomes hard and in-elastic, and fissures deeply with the movement of the hand (*see* Plate II, fig. *f*). If the ringworm is growing rapidly and the roots penetrate the prickle cell layer, so that serum is exuded between it and the horny layer, small vesicles form with clear contents, containing only serum. The pressure exerted on the nerves by the formation of these vesicles causes intense irritation (*see* Plate II, fig. *c*). Still larger vesicles are sometimes formed which rise above the general surface layer, and infection is very likely to occur with staphylococci, so that the contents of these vesicles become purulent, a condition spoken of as cheiropompholyx (*see* Plate II, fig. *e*).

Finally, the nails may be attacked. The nails of the hands are more commonly affected than those of the feet, probably owing to infection being carried under the nail by scratching the lesions between the toes and in the groin. Infection under the nail bed is comparatively rare, considering the number of cases of ringworm that are seen amongst our patients. There appears to be some evidence that implantation on to the nail only occurs when the nail bed is injured by trauma. The commonest lesion on the nail occurs at the end, when the ringworm causes a great deal of thickening of the horny layer with an alteration in the translucency of the nail. The nail appears to be chalky in colour, brittle and friable, so that bits break off, leaving an irregular shelving edge at the end of the nail (*see* Plate IV, fig. *c*). More rarely the base of the nail is infected, causing a deep furrow such as is seen in Plate IV, fig. *d*. In two or three instances we have seen a ringworm infection of the nail due primarily to a thorn injury and seen as a thickened brittle ridge which extends as far as the root of the nail.

Lesions on the body.—In Indians, *Tinea cruris* often affects the small area of skin in the region of the iliac crest which is subjected to friction of the loin cloth. The lesion is seen as an ovoid area of thickened skin with an irregular outline, and vesicles situated at the edge where the disease extends and is active. More rarely it extends right across the abdomen under the *dhoti* area (*see* Plate I, fig. *b*). *Tinea cruris* is also very commonly seen, especially in stout people, affecting the axilla. The infection is more common in Europeans than in Indians. The lesion appears as a bright red weeping eczema with an irregular circinate edge and the characteristic vesicles, (*see* Plate I, fig. *c*). In this plate, the ringworm is seen mainly affecting the axilla, but here and there are circular areas of ringworm situated on the flanks. In some Indians, especially amongst Ooriahs and manjis, the disease becomes much more extensive, leaving the *dhoti* area and attacking the body surface as far as the neck (*see* Plate I, fig. *d*). In these people the lesion resembles *Tinea imbricata* owing to the hyperkeratosis of the horny layer, but there is not the ridged ring-like appearance that is seen in *Tinea imbricata*. Moreover, at the growing edge, numerous small vesicles are seen which are liable to break down and become infected by pyogenic organisms. Occasionally in Europeans, especially those who wear coarse underclothing, the disease may be widespread over the body and appear either as a circular red area or areas which may merge the one into the other. In some cases, the disease may be so extensive as to affect the whole of the trunk, arms, legs, i.e., areas of the skin that are not exposed to the air and are subjected to friction by the coarse underclothing.

Finally, it may be said that *Tinea cruris* never extends above the neck on to the face although it may attack any other part of the body.

Complications.

The commonest complication of *Tinea cruris* is some form of streptococcal infection, which varies from the superficial infection called impetigo to the deeper infection of the corium, so-called eczema. These eczematous lesions are as a rule confined to the ringworm affected area. Occasionally the infection may become generalised (*see* Plate IV, fig. *e*), where the streptococcal infection involves the skin of the body, limbs and face area, giving rise to a condition resembling acute exfoliative dermatitis. These cases are often a mixture of arsenical dermatitis with a secondary streptococcal infection, as many of them have been diagnosed as syphilis, and have then been treated with one of the organic compounds of arsenic on the market. There are two factors that make this type of dermatitis fairly common in the Indian. Firstly, the doses that are given are often too large for the body weight, as the majority of our patients are well under 10 stone. The second factor, which we will speak about in a later paper, is that the basal layer in pigmented races contains some substance which is capable of oxidising many metallic salts. Frequently in *mangoe toe* streptococcal infections are produced by peeling off the top of the bullæ, which may cause an acute cellulitis starting from the interdigital cleft and extending up the foot. This type of cellulitis is more commonly seen during the hot weather.

The next common complication is infection of the vesicles by staphylococci, giving rise to pustulation of the vesicles, or bullæ situated in the horny layer of the palms and soles, a condition known respectively as cheiropompholyx and foot-tethers. The rarest complication is an infection of the ringworm lesion of the foot by the *Bacillus tuberculosis*; this

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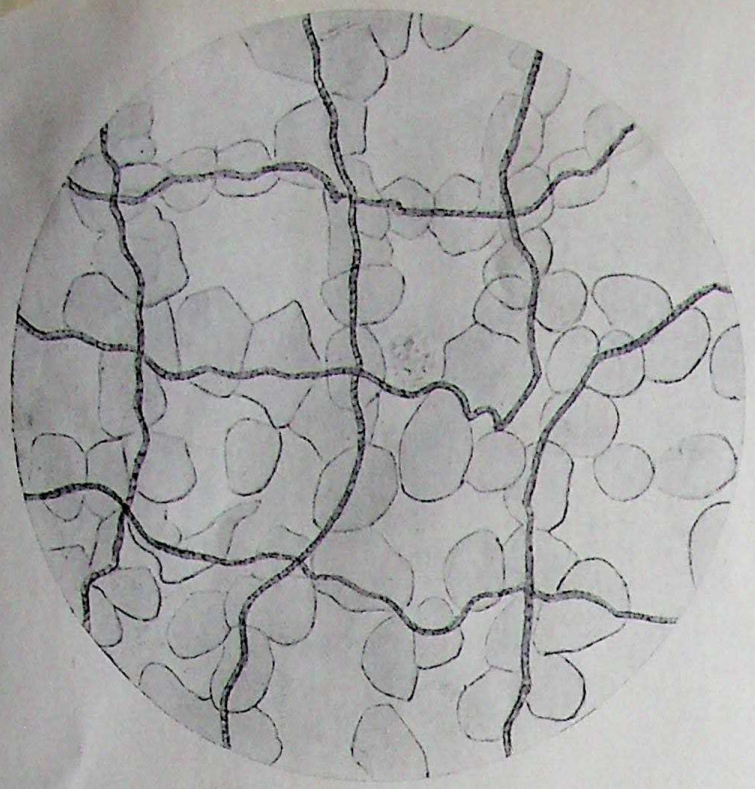
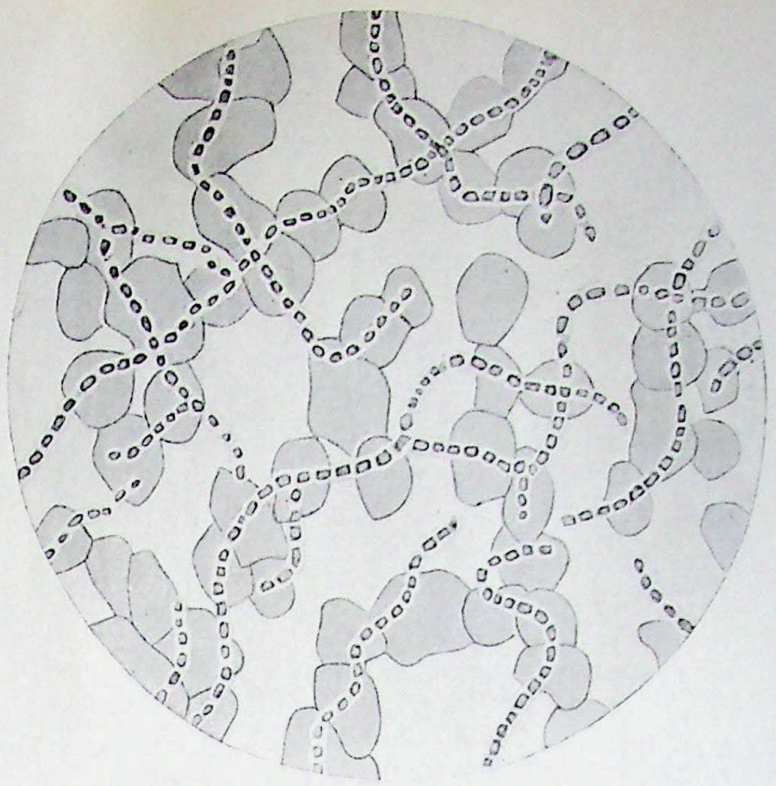


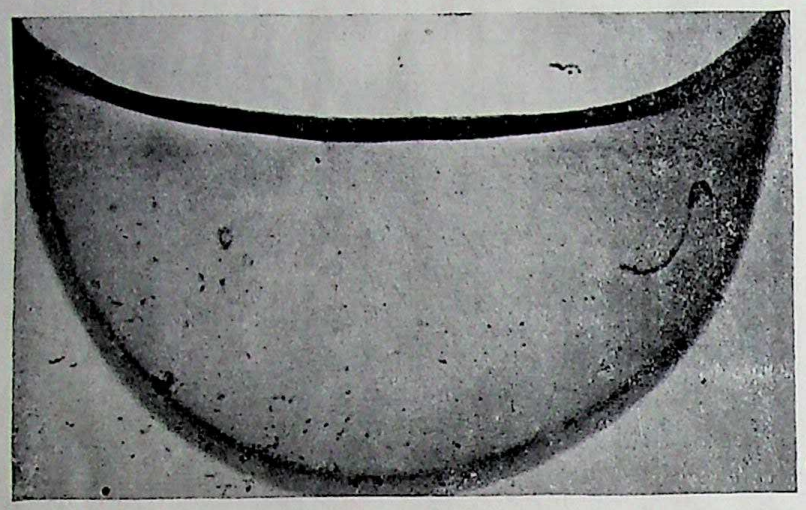
(*a*) The young unsegmental mycelium from a caustic potash preparation magnification 1|6th objective.



(*b*) Older mycelia segmental caustic potash preparation 1|6th.

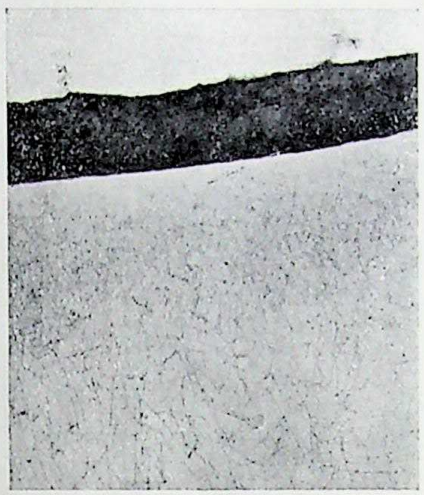
2

3



(*c*) Microphotograph of a section through the growth on an agar slope 1″ objective—(2) Dense layer of surface runners—(3) Fine *roots.*

1



(*d*) Same as (*c*) but magnified obj. 2|3rds.
(*i*) aerial hyphae.
(*ii*) surface runners.
(*iii*) roots.

2

3

(*e*) Microphotograph of roots in agar—1|6th objective—young mycelia unsegmental—old mycelia segmental.

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organism gives rise to a verrucose tuberculide such as depicted in Plate IV, fig. *a*. The regions that are commonly affected are those situated on the under surface of the foot, then those in the digital cleft, and finally in the lesion on the instep. There appears to be little doubt that this condition is due to infection of the skin by the *Bacillus tuberculosis* of human origin which gains access to the corium from the ground by walking on bare feet. We have not seen this complication in Europeans.

Mycology.

The detection of the fungus by scrapings made from the skin lesions of Tinea cruris. The lesions that should be selected should be those of recent origin, and actively extending but not affected by secondary infection. A scraping of the surface skin is made from the growing edge of the lesion, and fairly thick scales should be taken for examination. When the lesion contains vesicles as in cheiropompholyx, it is best to select those vesicles which only contain serum and are not purulent. With a sharp knife, like a corneal knife, the whole of the top of the vesicle is cut away and placed on a slide with the under surface upwards. The scales of the tops of the vesicles are best cleared in a 40 per cent. caustic potash solution and then examined with the microscope as for unstained objects. Owing to the variation in the thickness of the skin, it takes from 2 to 24 hours before the epidermis is properly cleared before the mycelium can be seen. In many text-books, especially the English ones, it is recommended to facilitate the clearing by heating the caustic potash solution. We do not recommend this procedure as the mycelium is very apt to be broken up. It is far better to wait until next morning, when the epidermis will be quite clear and the mycelium can easily be seen with the $\frac{1}{6}$th inch objective.

In the active lesions, that are rapidly growing, the mycelium is seen as a greenish grey coloured unsegmented mycelium and forms an irregular mesh work (*see* Plate V, fig. *a*). It is necessary to point out that when the lesions examined are vesicular, as in cheiropompholyx, or when the disease is not active a large number of scales have to be examined before the mycelium is seen. We have often had to examine as many as 16 vesicles before the mycelium was detected by the aid of the microscope. The method of using 40 per cent. caustic potash and giving sufficient time to clear the horny cells of the epidermis is far the best method of detecting the fungus in these lesions. In some books it is recommended to scrape the scales, place them on a slide smeared with albumin and remove the fat from the scales. The slides are then placed in equal parts of absolute alcohol and ether in order to fix the albumin and scales; stain for one minute with Manson's borax methylene blue. This method is only useful when the lesion is actively growing and is more applicable for *Tinea versicolor* and seborrhœa than for *Tinea cruris*. One rarely sees the mycelium in *Tinea cruris* infections by using the latter method.

Method of cultivation.—In India, the difficulty in obtaining primary cultures is owing to the number of other organisms that are commonly found on the skin. We are dealing with Indian patients, and one of their favourite remedies is to cover the lesion with cowdung or turmeric (*haldi*). Under these conditions we generally get numerous other organisms, such as staphylococci, yeasts, and spore-forming bacteria, which overrun the media and stifle the growth of the ringworm fungus. At first we used Sabouraud's maltose agar, and found that we had to use from 6 to 8 tubes with 5 to 7 inoculations on each tube, before we got a growth of these fungi. This meant that we had to do in each case some 30 to 40 inseminations. To prevent any secondary organisms from growing, we first tried the effect of drying the scales. The scales were placed between two sterile slides wrapped in paper and kept in the desiccator for from 7 to 10 days. We found that drying inhibited most of the staphylococci and yeasts, but did not affect the spore-forming bacilli. We also tried to sterilise the scales by utilising the actinic power of the sun, exposing the scales to direct sunlight for two or more hours. This method also failed completely to eradicate the spore-forming bacilli and other organisms. We next tried growing them on plaster of Paris platforms in the presence of moisture. A circular small platform 3 inches in diameter and $\frac{3}{4}$ of an inch in height is made of plaster of Paris; this is sterilised by hot air and placed in a sterile petri dish with about $\frac{1}{4}$-inch depth of sterile water. On top of the platform a large number of scales or hairs were scattered and a little water added by a sterile pipette to moisten the surface. On the surface of the platform, the scales remained moist owing to the continued percolation of water through the plaster of Paris platform. From the 3rd to the 5th day, the fungus was seen to be growing from the scales. By this method, we were able to inhibit the growth of staphylococci, yeasts, but not spore-forming bacilli, as the ringworm fungus could grow on these moist scales, whereas there was insufficient nourishment for the other organisms. So far, we have found this method to be the best for obtaining primary cultures free from other organisms.

Secondary cultures.

Secondary cultures were made, either from the primary ones on Sabouraud's agar or from the plaster of Paris plates. We use a soft iron

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wire as a needle bent at a right angle, the projecting end being about an ⅛th of an inch long. This needle can also be made of stout platinum wire, but the iron wire ones are cheaper and are as good as the platinum needles. The culture is scraped with this iron wire hook, care being taken to select the right area of growth. The best results are obtained from the growing edge of the primary growth, as the secondary cultures are less likely to be pleomorphic in character. When the material is taken from the downy area, the secondary cultures are always pleomorphic in character. As a rule, one tried to get the growth from the surface of the agar so as to include the surface runners. Plate VI, figs. *a* to *d* shows the appearance of the secondary cultures on Sabouraud's maltose agar. Three things will be noticed in these cultures: (1) The cultures are all circular in shape, as the spread occurs centrifugally from the point of insemination. (2) Circular rings will be observed on the cultures, which denote waves of growth, like the yearly rings of growth seen on section of the stem of a tree. (3) There are deep furrows which are caused by the roots contracting and infolding the surface of the growth, so that in the earliest cultures one sees three lines of tension like a Y, and in the later cultures nine or more tension lines arranged in a regular manner.

As regards colour variations, it will be seen from Plate VI, figs. *d* to *i* that there are also numerous colour variations in these cultures in which all the organisms have the same morphological characters.

The study of the colour variations.—Castellani and others have held that there are several species of *Tinea cruris*; the first author has definitely named three species. In this study we will show that these colour variations are purely due to substances in the media. It will be noticed that the colour variations vary from growths which have no colour, such as Plate VI, fig. *d*, to growths which are yellow or orange in colour, and in some the central area is a reddish purple colour, such as Plate VI, fig. *g*. Sometimes the primary growths are coloured and the secondary growths are devoid of colour, whilst at other times the reverse holds good. To test these colour variations we inoculated these six colour varieties on the following media (*see* Plate VII, fig. 1). On Sabouraud's maltose agar, the primary growth may be yellow, and the secondary growth a purple red, as is shown in the plate. On glucose agar the cultures were nearly always purplish in colour. On ordinary agar they had a slight lemon colour. On Dorset's egg media with glycerin, the growth was very scanty and of a deep purple colour. On 2 per cent. saccharose agar, the growth had an orange colour.

We therefore see that these colour variations are not due to special varieties of the fungus, but are purely dependent on the chemical substances present in the media, as one sees the identity of the cultures when several different media are employed for the secondary cultures. Looking at Plate VII, one also notices the differences in the development of the rings on these different media, as well as the variation in the extent of the furrowing. Pleomorphism or downiness likewise was most marked on glucose agar and least on blood agar. We next took the six different colour variations of *Tinea cruris* that are depicted in Plate VI, figs. *d* to *i* and planted them on a synthetic media which we had devised, consisting of sodium aspartate, tryptophane and argenine nitrate. On this media (*see* Plate VII), the colour and general appearance of the secondary cultures turned out to be identical (fig. *ii*), showing that all these variations were those of a single species. We can, therefore, state definitely that all these variations in colour, pleomorphism, rate of growth, and lines of tension are dependent on variations in the media. One has no right to call a white, pink or red rose a different species of rose, but they are merely colour variations in the same species; no more should one consider these variations in *Tinea cruris* as due to different species.

Morphology.

The morphology of the *Tinea cruris* fungus was studied by three methods:—

(1) In every case a study of the aerial hyphæ and the end organs was made by hanging drop preparations on Sabouraud's maltose agar. The technique is as follows:—A deep well slide is taken and sterilised, the coverslip is sterilised by heat, and a large drop of melted Sabouraud's maltose agar is placed on the inverted surface on the coverslip, and allowed to solidify. The whole of this technique should be done aseptically in order to prevent any infection of the agar. The agar on the inverted coverslip is now inoculated with the culture to be tested for morphological characters. The edge of the coverslip is well smeared with vaseline and a sterile welled slide placed on the inverted coverslip. The culture is now placed in a sterile air-tight chamber, and should be kept in the dark and examined at weekly intervals for a month or six weeks. There are three types of end organs seen on the aerial hyphæ of all the growths that we have classified as *Tinea cruris*. The first end organ [*see* Plate VIII, *a*(*i*)] is a segmented spindle shaped end to the hyphæ, which the French call fuseaux. The second type of spores are the bunched conidia which are oval or round spores or conidia occurring in bunches; these are shown in Plate VIII, *a*(*ii*). The third type of conidia are the single round or oval conidia. Besides these end organs, tendrils may be seen along the hyphæ, as in Plate VIII, *a*(*iii*), corresponding to the tendrils

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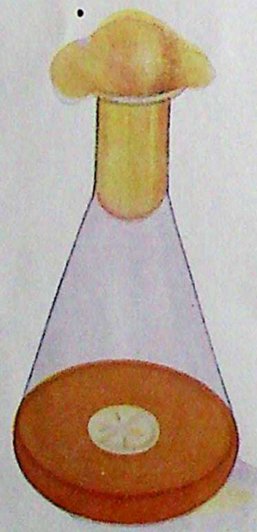
PLATE VI.

Culture of Tinea Cruris *on Saboraud's Maltose Agar.*



(*a*) First week.

(*b*) Second week.

(*c*) Third week.

(*d*) Fourth week.

The different color varieties of Tinea Cruris.

(*e*)

(*f*)

(*g*)

(*h*)

(*i*)

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of many climbing creepers; sometimes these tendrils grow and produce knots along the mycelium.

(2) *Surface runners.*—The surface runners form segmented on non-segmented mycelial threads which run on the surface of the agar and spread from the centre in a centrifugal manner, they can be studied by scraping off the aerial hyphæ and examining the surface; they are best studied on blood agar. The spread often occurs as waves of growth, giving rise to the concentric ringed appearance of the surface of many of these cultures.

(3) *The deep roots.*—The deep roots are best studied by taking young cultures on Sabouraud's media, breaking the test tube and making freehand sections of the agar with a Gillette razor blade transversely through the media; then staining these transverse sections of the agar with weak carbolic fuchsin. In Plate V, fig. *c* is a microphotograph of such a section taken with a 1-inch objective. The surface roots form a thick plaque on the surface, extending from side to side of the agar tube. From the under surface of the runners, roots are sent down in a radiating manner right down to the bottom of the tube. Looking at a culture from the side, the roots appear fine and diaphanous like a jelly fish, extending deep down into the agar. If the section of the agar is now examined with the $\frac{2}{3}$rd. inch objective (*see* Plate V, fig. *d*) the aerial hyphæ will be seen at (1), the surface runners at (2) which form a very thick layer, and the roots in the media at (3). If the roots are examined with a higher magnification, viz., $\frac{1}{6}$th-inch objective, the root mycelium will be seen to be of two kinds, (*see* Plate V, fig. *c*) fine unsegmented roots of the young mycelium, and coarser segmented roots of the older mycelium. We will discuss the importance of these roots later when dealing with the morbid anatomy of the changes that occur in the skin in ringworm lesions.

From the morphological study, it will be seen that there is only one species of *Tinea cruris* which is uniform in the shape of its end organs, surface runners and roots. The variations that have been observed in the general appearance of the cultures, in their colour and pleomorphism are not sufficient to justify one in subdividing *Tinea cruris* into several species. Moreover in studying these ringworm fungi, which are higher fungi consisting of roots, surface runners and aerial hyphæ with different end organs, all these morphological characters should be first studied before one can differentiate them into different species, and not as has hitherto been done mainly by examining the surface appearance of the cultures. Further it must be remembered that for the production of aerial hyphæ and end organs of fructification, the right media should be used, otherwise the hyphæ may be sterile and carry no end organs of fructification.

Morbid anatomy.

Recently we have been working on the general histology of the skin and find that in certain parts of the body where the skin is thin, it consists of only two layers, a layer of horny cells, 2 or 3 cells in depth, and a basal layer. It is in such areas of skin that the *Tinea cruris* fungus generally starts growing and spreads to neighbouring areas of thicker skin. The spread takes place by the surface runners penetrating in between the layer of horny cells. From these surface runners, roots penetrate down through the basal layer into the papillæ, particularly at the growing margin, so that the lesions produced are frequently circular in outline with thickened sodden epithelium in the middle of the lesion, and small vesicles at the edges where the roots are penetrating. When these vesicles rupture, they expose the tops of the papillæ tufts, giving rise to a typical lesion which is described as eczema. If the roots penetrate rapidly into the basal cell layer and much serum is exuded under the horny layer, the whole of the surface epithelium comes off, leaving a raw weeping surface, most commonly seen in the groin, and first described as the marginal eczema of Hebra. The surface runners may extend from the areas of fine skin of the hands and feet to the thicker areas such as occur on the palms and soles. Here the roots penetrate the prickle cell layer, and it depends on the rate of penetration and exudation of serum as to the type of lesion seen on the skin surface.

(1) If the roots penetrate slowly so as to irritate the prickle cell layer and produce the condition of spongiosis, the excess of serum in this area causes a hyperplasia of the prickle cell layer, so that a larger amount of horny cells are formed and the lesions appear as plaques of thickened skin, imperfectly cornified.

(2) When the roots penetrate the prickle cell layer rapidly and a large quantity of serum oozes under the horny layer, a vesicle is formed (*see* microphotograph Plate VIII, fig. *b*). In Plate VIII, fig. *c* the same vesicle has been drawn with a higher magnification and the mycelium is seen at (2) and grouped conidia at (1). In the nail (Plate VIII, fig. *d*) the roots penetrate the horny cells of the nail causing areas of liquefaction in their downgrowth; this allows air to enter and gives the nail that dull opaque, brittle-like appearance which is so characteristic. With a $\frac{1}{12}$th-inch objective (Plate VIII, fig. *c*) the fine non-segmented root mycelium is seen at (1), and areas of liquefaction in the keratin are seen at (2).

Sir Almroth Wright has shown that the antitryptic property of serum is capable of inhibiting most organisms, but such serum is favourable to the growth of the cocci, viz.,

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staphylococci and streptococci. For this reason, as soon as serum collects under the skin to form vesicles, they become infected by staphylococci, and pustules are formed, such as in cheiropompholyx and foot-tethers. When the papillæ are exposed by exfoliation of the horny layer, as occurs in the fine skin of the groin and the web of the hands and feet, invasion by streptococci is extremely common giving rise to the clinical lesion called eczema, which is characterised by induration of the corium, intense irritation, and some type of exudation depending on the amount of serum exuded and the toxicity of the strains. In India, the majority of our cases that would be classified as eczema are cases of *Tinea cruris* infection of the skin with secondary streptococcal invasion of the corium.

As regards these secondary infections, (1) *Staphylococcus albus* or *aureus* can usually be isolated from the turbid vesicles, blebs or from the surface of the eczematous lesion by plating on ordinary agar. The colonies at the end of 24 hours time are large round colonies, white (*albus*) or golden (*aureus*), or small coloured colonies (*mollis*).

(2) Streptococci are more difficult to isolate from these lesions and they are best cultured in the weeping stage when the serum becomes clear after the application of evaporating lotions. The method we adopt is to take a loopful of this serum or serum from the deep fissure and then plate on glucose agar or blood agar. The colonies are seen as fine transparent colonies after 24 hours and are usually hæmolytic when grown on blood agar. We have isolated strains of these hæmolytic streptococci which differ slightly from those that have been previously described in bacteriological text-books.

Prognosis.

As regards a permanent cure the prognosis is very bad amongst out-patients, but a temporary cure is readily brought about by the various remedies that one uses in the treatment of ringworms. The difficulty in obtaining a permanent cure is due to the fact that as soon as the patient obtains relief, treatment is stopped and he still resides in the infected locality. It is impossible for the ordinary out-patient to realise that the fungus still lurks in his clothes, shoes, and the room in which he lives, nor will he discontinue walking about on damp soil with bare feet. With private patients, the prognosis is very much better, as they will follow one's instructions and use preventive measures against the reappearance of the disease. Climate has a profound effect on the growth of these fungi, for they disappear in a few days time in a cold climate and reappear when the patient comes down from the hills and returns to the heat. When the disease has been extensive and the patient can afford it, a change to the hills will bring about this period of quiescence, and then one can employ strong remedies and eradicate the disease. As the patient's skin forms a suitable site for the growth of this fungus, it is not surprising that recurrences take place, if no precautions are taken to prevent infection.

Treatment.

The essential points to realise in these different lesions of *Tinea cruris* on the body are (1) that during the acute stage, whether the lesion is pustular or eczematous in appearance, the infection is always secondary to ringworm, but the septic condition has to be dealt with first. (2) As the primary lesion is due to *Tinea cruris*, a cure cannot be obtained until the ringworm fungus is destroyed, but strong parasiticidal remedies can only be used after the septic infection has subsided. (3) There is every possibility of the patient becoming re-infected after a complete cure, as the skin forms a suitable soil for the growth of the *Tinea cruris*. Treatment can therefore be subdivided into three stages depending on the stage at which the infection is seen.

(1) *Acute stage.*—When there are excoriations on the surface, weeping or vesiculation only the very mildest remedies can be used; otherwise an acute spreading dermatitis may be set up if any energetic treatment is used during this stage. Most of the acute cases of exfoliative dermatitis have been caused by injecting large doses of arsenical compounds, in the mistaken diagnosis that the lesion was a syphilitic one, or by using strong applications like chrysarobin. During the acute stage, when the infection is due to streptococci, the best application to use is lotio calaminæ (extra B. P.). This should be applied on an open piece of lint and kept moist all the time by dipping the lint back into the lotion. Evaporation should be aided as much as possible by fan action or by the lint being left uncovered. Its main action is due to the cold, which constricts the superficial vessels and prevents the oozing of serum which is so necessary for the growth of the streptococci; at the same time the lowered skin temperature markedly inhibits the marginal spread of the ringworm parasite. When pruritus is marked, carbolic acid 3 to 5 minims or aqua lauracæi 1 dr. to each ounce, can be added to the above mentioned lotion. When impetigo is present, one combines the use of unguentum hydrarg. ammon. dil. 5 to 10 grs. to the ounce at night, with lotio calamine during the day. When staphylococcal infection is marked, pustules should be opened up, and we prefer the use of acriflavine 1 : 1,000 for the lesions on the hands and feet, but it must be remembered that it will dye the clothes.

Stage of resolution.—As the cold constricts the capillaries and prevents exudation of serum, the weeping stops and the vesicles dry up, the surface skin becomes very hard and

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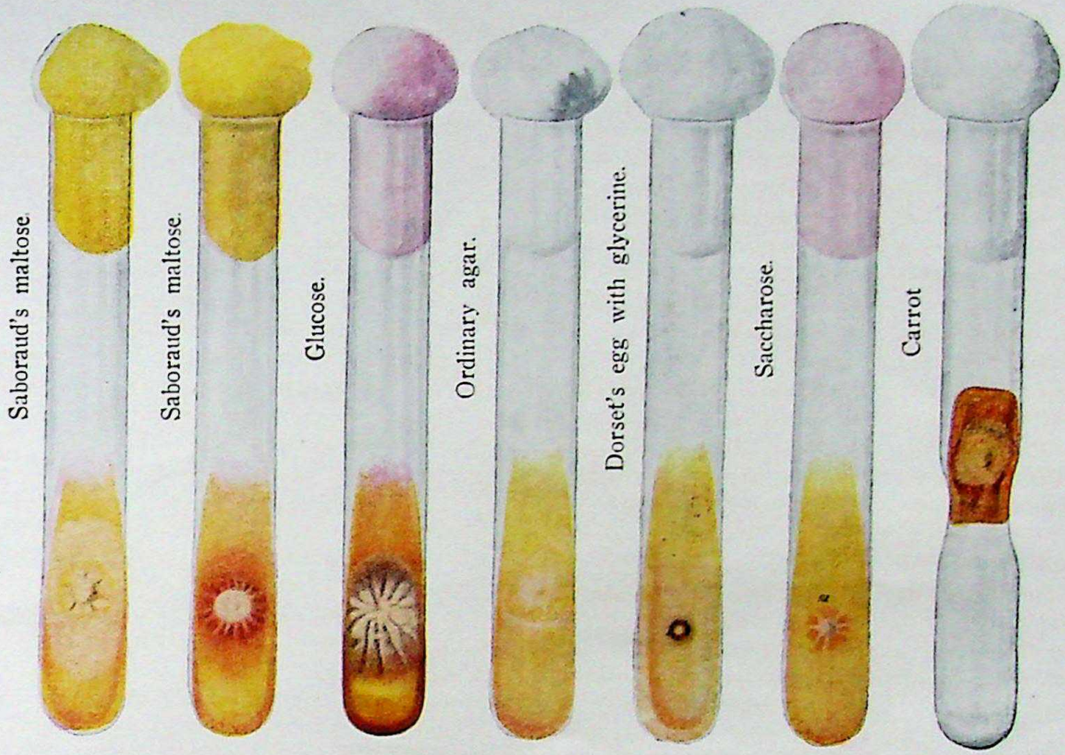
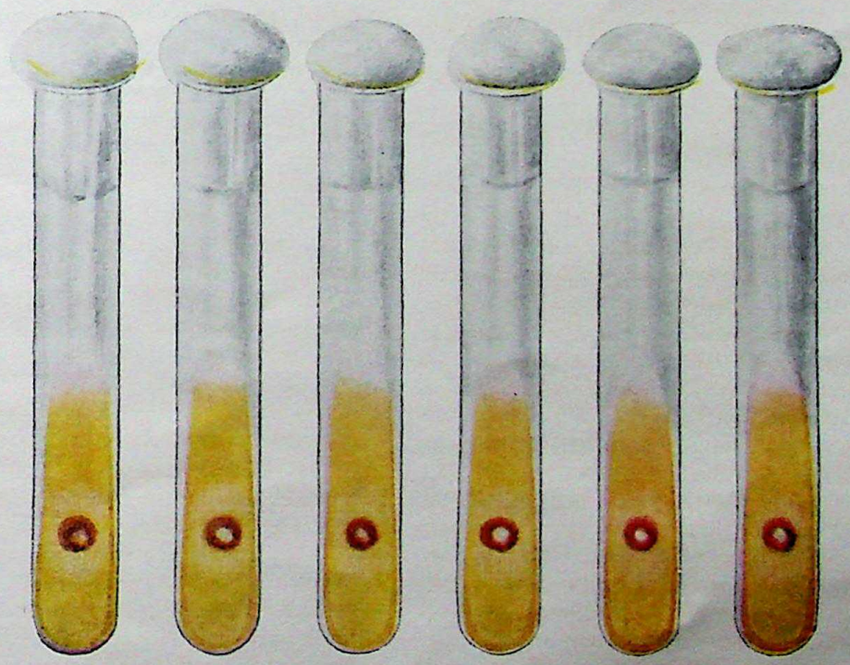
PLATE VII.

The growth of Tinea cruris *on different media.*





The different color varieties of *Tinea cruris* from Plate VI grown on a Synthetic medium containing Sodium Aspartate, Arginine Nitrate and Tryptophane.

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dry and on movement tends to fissure. At this stage the best treatment is a combination of lotio calaminæ during the day and the application of Lassar's paste without salicylic acid at night; this keeps the skin moist and pliable. In India, the ordinary formula for Lassar's paste is too strong, as the paste becomes thick and difficult to spread on the skin; we therefore use the following formula.

Zinc oxide	..	grs. 30
Starch	..	grs. 30
Adeps lanæ hydrous	}	½ an ounce of each.
Liq. petroleum pure	}	

(2) *The treatment of the ringworm lesion.*—When the acute symptoms of the secondary infection have subsided, and there is only thickening of the horny layer without any exposure of the prickle cell layer or the apices of the papillæ, we are then in a position to use parasiticidal remedies, otherwise there is a great danger of stirring up the disease. The aim of all these parasiticidal remedies is to set up a rapid surface desquamation in order to remove the roots of the fungi. This can be done mechanically by the judicious use of pumice stone, or preventing the thickening of the skin by protecting the instep from the irregular pressure of rubbing in wearing socks. Numerous keratolytic and reducing agents are used, and in our opinion the following are the best. Whitfield's ointment, containing 25 grs. of benzoic acid, 15 grs. of salicylic acid gives the best all round results, except in certain situations. Should this ointment irritate, we use it combined with calamine lotion until all irritation ceases, i.e., apply the ointment at night and the lotio calaminæ during the day. When the ointment is applied the hands and feet should be covered by cotton gloves or socks. If the body is affected, only fine linen underclothing should be worn next to the skin.

In *mangoe toe*, when there is great thickening of the skin in the inter-digital cleft, the best remedy is resorcin 1 drm. dissolved in 1 ounce of tinct benzoinæ co. This is applied every night until the surface skin is removed and the underskin becomes thin and healthy. Its action should be carefully controlled, otherwise an acute inflammatory condition may be set up. On the appearance of any redness or irritation the lotion should be discontinued the next night, and some simple ointment be applied like boric ointment. The stains from the benzoin lotion can easily be removed by spirit. The resorcin ointment is usually too strong to be applied to any lesion situated on the fine skin, such as about the fingers, ankles, etc., but it is very useful in the extensive cases that look like *Tinea imbricata*. The strongest remedy is chrysarobin, but it has to be carefully controlled, and should never be used when fissures or the slightest signs of inflammation are present in the lesion. As an ointment it is messy and stains all underclothes and sheets indelibly. It can be employed in two ways. (1) Chrysarobin 10 to 40 grs. dissolved in an ounce of pure chloroform painted on the surface of the lesion, and as soon as the chloroform has evaporated the surface is painted over with two or three layers of collodion flexile. (2) Traumaticin. This is made by dissolving 1 drm. of indiarubber or gutta-percha in an ounce of chloroform, but it takes about a week before the indiarubber has been completely dissolved in the chloroform. In this liquid the requisite amount of chrysarobin is dissolved, varying from 10 to 40 grs. to the ounce, and is then applied on the lesion. This preparation is not so powerful as the simple. chloroform solution.

In chronic cases, especially where there is a good deal of thickening of the stratum corneum such as occurs on the palms, soles and instep, these keratolytic agents are of very little use, as they cannot penetrate the thickened horny layer. For these cases we advise *x*-ray treatment. We are indebted to Major J. A. Shorten, I.M.S., the Honorary Radiologist of this School for details of the treatment that he uses for these cases. His technique is as follows:—

The apparatus used for the treatment of *Tinea cruris* by *x*-rays at the School of Tropical Medicine is one which gives a constant voltage of 70,000 volts, and 3 milliampères current. The skin distance ordinarily used is 8 inches from the target. If for any reason this distance has to be increased, allowance in exposure is made in accordance with the law of inverse squares.

Three variations in exposure are used:—

(1) Unfiltered pastille doses, the time exposure is 5 minutes.

(2) Filtered pastille doses filtered through 1 millimetre thickness of aluminium. A pastille is placed on the distal side of the filter at half the skin distance time, 18 minutes, 36 seconds.

(3) Filtered fractional doses through a 1 millimetre aluminium filter, exposed for 5 minutes. Five such doses cause complete epilation in normal skins without inflammatory reaction.

The cases who were treated were those who did not yield to the ordinary methods by ointments, etc., and to begin with were given a series of fractional doses up to a full pastille dose. Later if necessary ¾th to ⅛th of a pastille dose was given with intervals of not less than one month between each series.

When secondary pyogenic infection is present, great care should be exercised in the length of the exposure. Treatment should be stopped on the slightest signs of any reaction. From an experience gained in treating a large number of cases of *Tinea cruris* of the glabrous skin, especially on the hands and feet, one

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knows that relapses are apt to occur within 12 months after the *x*-ray treatment. The disease never progresses as far as the original attack, and responds readily to the *x*-rays. Three or four such relapses are common; each relapse diminishes in intensity, and finally the treatment results in a permanent cure. For this reason, we advocate the use of parasiticidal remedies for a few weeks after the *x*-rays, in spite of the fact that the lesions appear to be cured by them.

When ringworm attacks the nails, the disease is singularly intractable to treatment. If the nail has been extensively involved, cure is impossible unless the nail is removed by avulsion. The thickened nail bed should be scraped until all signs of the disease have been removed and healthy matrix is reached. The nail bed should be dressed with a parasiticidal ointment such as Whitfield's until the healthy nail has grown. When the disease is seen early before the invasion of the nail bed has occurred much beneath the anterior border, a cure may sometimes takes place by adopting the following treatment. The nail plate is softened by using an alkali such as soft soap or a solution of caustic potash, this should be applied continuously under a rubber stall. The alkali should be applied daily until the nail is thoroughly softened. The nail should now be paired down as thin as possible with a piece of glass. This is followed by the continuous application of some strong keratolytic agent such as mercury, iodine, chrysarobin, etc. A 2 per cent. hydrag. perchlor, in rectified spirit is clean and efficient, but the senior author's assistant Dr. K. P. Banerjee has elaborated a blunderbuss mixture containing all the three parasiticidal remedies, but it stains the nails.

During the course of the *x*-ray treatment we generally recommend these patients to use a simple ointment like Lassar's paste and to continue the application of Whitfield's ointment for two or three weeks after the last exposure. The treatment should always be continued for at least two weeks after all lesions have apparently disappeared on the skin.

The prevention of relapses.—We have seen that patients are particularly susceptible to infection by *Tinea cruris,* as the skin forms a suitable soil owing to moisture, friction, etc. The first thing to be done is completely to eradicate the disease from the skin surface, and we have pointed out that *the nidus of the disease* may lurk in the thickened area of the skin in the interdigital cleft between the 4th and 5th toes, or it may be seen in the groin where the skin is slightly dark in colour with a slight furfurous desquamation. These two sites are easily overlooked, unless the skin is carefuly examined in a good light.

The next important procedure is to prevent re-infection. This may occur by walking about the house barefooted and also in public baths when no shoes are worn by the bathers. The remedy is obvious; to prevent infections by both these means. Re-infection may also occur through infected shoes, or socks; these can be disinfected by swabbing the shoes with pure lysol and boiling the cotton socks after use. Infection of the skin surface can easily be prevented by the use of a sulphur antiseptic powder as the spores are then on the surface and can easily be reached by antiseptics. When the mycelium penetrates deep down into the horny layer, these antiseptic powders are of little use and only act by preventing moisture. We prefer a sulphur camphor powder consisting of 1 part each of sulphur precipitata, camphor, and boric acid, 2 parts of zinc oxide; and 3 parts of starch. Some use a salicylic talcum powder or antiseptic lotions. We recommend that after the morning bath the likely areas of infection, i.e., between the toes and groin should be very lightly dusted with this powder, using a powder puff to apply it. It should be done during the hot weather; dusting the surface every other day or so is sufficient to prevent infection in these areas. On the other days, a bland absorbent powder should be used to keep these parts dry. Sulphur is an irritant to the skin, and if freely applied is apt to set up a dermatitis.

We have already seen that friction and the prevention of moisture play an important part in allowing infection to occur. Friction can be prevented by the use of proper underlinen and properly fitting boots and clothes. Moisture can be prevented by dusting the parts with an absorbent dusting powder and allowing free ventilation by the use of properly fitting clothes, etc.

A SHORT DESCRIPTION OF AN EPIDEMIC DISEASE OF CHILDREN PREVALENT IN GOA SINCE 1921.

By AUGUSTINE PAES, M.B., B.S. (Bombay), D.T.M. (Bengal),
Goa, Portuguese India.

THE disease may be divided into three forms:—

Benign.—In this, the child vomits either the food that it was just then taking or had taken at a previous meal and, soon or immediately after, falls into a torpor and somnolence from which it is extremely difficult to awake it, although just before the vomiting it was apparently in perfect health. Even if it is wakened up by strong counter-irritants such as hot baths, it at once falls back into somnolence and there is no contraction of any part of the body, but on the contrary complete flaccidity of every muscle in the body. Pulse 100 to 120 and respirations 20 to 30. Pupils slightly or moderately dilated. Spleen and liver normal. There is constipation and slight tympanites. The sensibility of the

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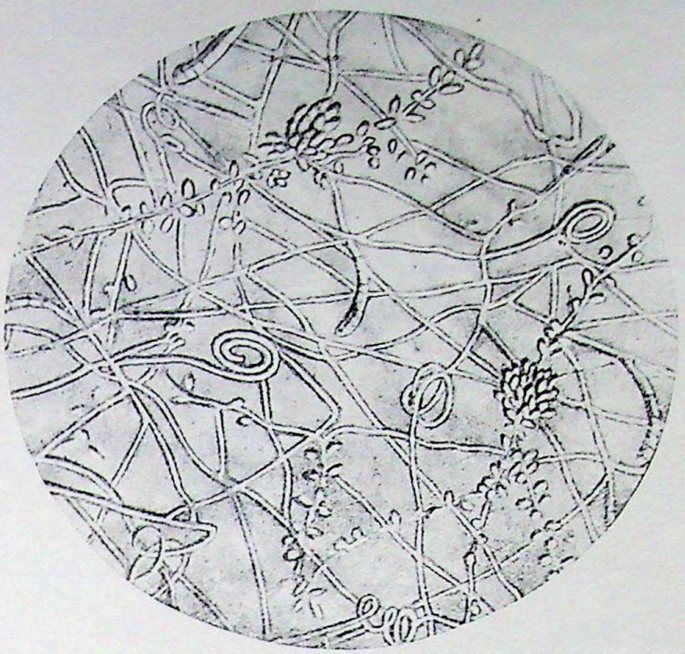
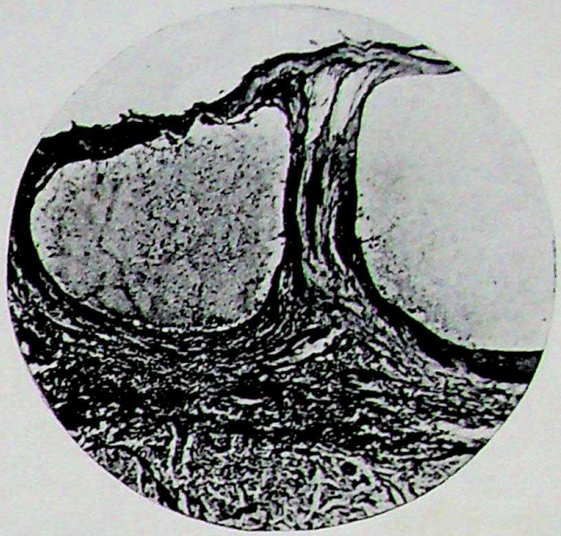
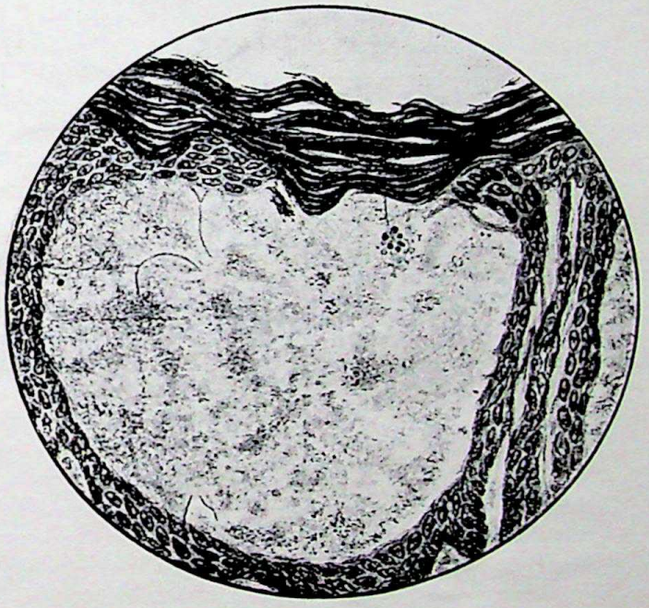
PLATE VIII.



(*a*) Drawing of a hanging drop culture 1|6th objective, (1) Fuseaux, (2) Grouped conidia, (3) Tendrils, (4) Knots.

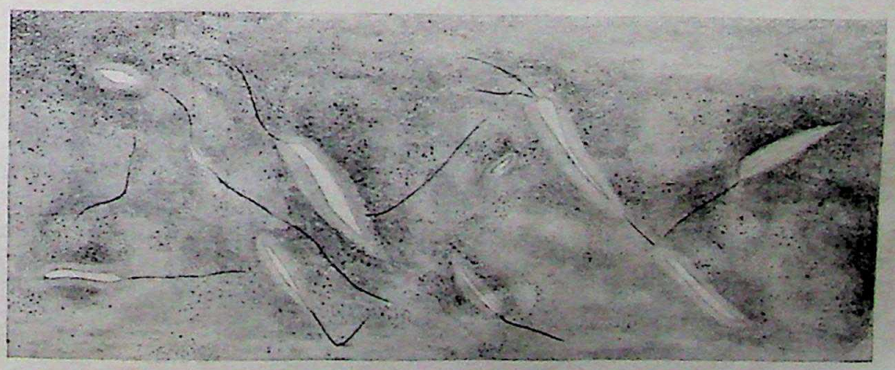


(*b*) Microphotograph of a vesicle on the hand—2|3rd objective contents consist mainly of serum.



(*c*) Drawing enlarged of (*b*) showing (1) mycelium with grouped conidia, (2) mycelium.

(*d*) Microphotograph of ring-worm of the nail 2|3rd objective, note the liquefaction caused in the nail bed by the mycelium.



(*e*) Drawing made from (*d*) 1|12th objective. Note the fine mycelium (1) and the areas of liquefaction (2).

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skin is normal and the urine is normal in colour and amount.

This variety may also begin with a motion, which may be mucoid or even fæcal with normal colour and of semi-solid consistency.

Severe.—In this variety, the vomiting is continuous, the stomach not retaining even teaspoonfuls of water or even, when everything is stopped by the mouth, constantly bringing up a little clear mucous fluid. Then follow convulsions which may be one or two in moderately severe cases to many in very severe cases. The moment the convulsions stop the whole body becomes completely flaccid and the child returns to its comatose condition. In fatal cases, the constipation cannot be overcome by any means, and the tympanites goes on rapidly increasing till before death the abdomen becomes enormously distended and no amount of fomentations, enemas, or even injections of pituitrin can overcome it. The enemas as well as purges are immediately rejected at first, but just before death may be retained, still further increasing the enormous distention of the abdomen. Finally just before death the child passes a big stool, often containing undigested food or sometimes pieces of some fruit that it had previously eaten.

There is complete anæsthesia of the body, the child not feeling even the pain of injections. The pupils are widely dilated and in fatal cases there is loss of the corneal reflex. In fatal cases there are always tympanites and convulsions, and of the two I have personally found that the former is more ominous, as there have been cases that have recovered even after 30 to 40 convulsions, but none that had excessive tympanites.

Sometimes the child, who had gone to sleep in perfect health, suddenly gets up in the middle of the night to pass a small mucous stool and soon after enters into the comatose state; at other times, it may get up with intense thirst and on drinking a little water gets vomiting, which then becomes uncontrollable.

Fulminant.—These cases last only a few hours. I have seen a case in which a well-built Hindu child of 4, who had been playing till 8 in the morning, went to sleep. Shortly after the mother went to look at him and found him unconscious. I was called at about 9 o'clock and found the child completely unconscious, even to the loss of the corneal reflex, whilst an intramuscular injection of quinine, given with the idea that it might be a case of malignant malaria, was not felt by the little patient. The child died soon after, the disease in this case lasting not more than an hour and a half to two hours.

In more than 99 per cent. of the cases there is no rise of temperature. Very rarely the temperature rises from 99° to 100°F.

Rarely there may be profuse sweating, slight contraction of the muscles of the neck and of the rest of the body, even in the intervals between the convulsions. I have never noticed any Kernig's sign and, as I have said, in more than 99 per cent. of the cases the neck muscles are completely flaccid, the head falling helplessly into any position.

Epidemiology.—Children with chronic gastro-enteritis get the most severe attacks. In 95 per cent. of the cases, the disease occurs in children under 6 years of age and, although rare cases have been reported among adults (about 10 at the most), I personally have never seen a case in a child of over 10 years in about 500 cases that I have seen in my own practice, or in consultation with others, during the 6 years that the disease has been prevalent.

The disease is most prevalent during the hot weather, although there is a fair number of cases during other times of the year.

In the great majority of cases, it is the Christian children that get the disease, although the sanitary conditions among them are far better than among the Hindus. Two explanations are offered for this; one is that the Hindus do not mix freely with the Christians and so escape the infection. Against this there is the fact that there have been a fair number of cases among the Hindus, and as during these there has been free intercourse among the different Hindu families, the disease should have spread among them with even greater ease, considering their lower sanitary standards. The other explanation is that the Hindu children are given a very light diet at night, and this seems more probable.

Mortality.—A Commission appointed by the local medical association has found recently that it is only in the severe type of the disease that the mortality reaches 30 per cent. and that, in the mild type of the disease, the mortality is less than 5 per cent. and that, as the latter type far outnumbers the former, the combined mortality is 10 per cent. only.

The locality is malarious and parasites have been found in the blood of most of the cases examined. A Commission appointed by Government came to the conclusion that it was cerebro-spinal meningitis on finding an intracellular diplococcus in the cerebro-spinal fluid, and on finding the meninges intensely congested and the cerebro-spinal fluid turbid and even thick and purulent in two *post-mortem* cases.

Although the finding of the meningococcus clinches the diagnosis, these notes are written on account of the peculiarity of the disease in various ways.

1. No typical symptoms of cerebro-spinal fever occurred, even in a few out of the two thousand odd cases which have occurred since 1921; on the contrary, there is complete muscular relaxation, and an afebrile course.

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2. A recovery rate of 70 to 90 per cent., with no after-sequel, and that in cases which had had three or four attacks.

3. The best and most effective treatment is a brisk purge at the commencement of the attack; it produces a complete evacuation of the bowels, and recovery is as complete and rapid as was the onset of the disease.

4. The administration of antimeningococcus serum did not improve results.

5. The child is either dead or has completely recovered within two to three days.

6. Even in the very severe cases which recover, recovery is as rapid as in the mild cases.

7. It has been suggested that the epidemic may be a mild one associated with a parameningococcus, but the symptoms are those of an overwhelming toxæmia; the complete flaccid relaxation of the muscles of the body is characteristic of such a condition rather than of cerebro-spinal fever.

8. The clinical diagnosis in most cases was either one of acute gastro-enteritis, or of possible infection with worms.

THE PLACE OF PLASMOCHIN IN THE TREATMENT OF MALARIA.

By B. G. VAD, M.D.,
and
G. B. MOHILE, M.B., B.S.,
Sir J. J. Hospital, Bombay.

ON the 25th September, 1926, *Reuter* announced the discovery of Plasmochin, a new cure for malaria, and the results obtained by Professor Mühlens of the Tropical Institute, Hamburg. Through the courtesy of Professor Mühlens and the Farbenindustrie Aktiengesellschaft, we were able to obtain the first samples for trial early in December, 1926. By that time the malaria season of Bombay was over and hence the difficulty of getting a sufficient number of suitable cases for investigation. The observations were carried out in the wards of Major S. S. Vazifdar, I.M.S., Senior Physician, Sir J. J. Hospital and Professor of Medicine, Grant Medical College, Bombay, to whom we are highly indebted for his kindness and help.

Plasmochin is the outcome of team work by the chemical and chemo-therapeutic sections of the Elberfeld factory. Perkins, in 1856, as the outcome of a study of the possibility of quinine synthesis, isolated the first coal tar dye, mauvein. At that time it was supposed that the quinine molecule contained two chinolin rings, but in 1890 the workers at the Elberfeld factory proved that this view was wrong. Dr. Horlein describes Plasmochin as an alkyl-amino-6-methoxy-quinoline salt, obtained by synthetic methods, and not a derivative of quinine. It is a tasteless, light-yellow, finely granular powder; fairly easily soluble in alcohol, soluble in water to 0·03 per cent. at 20°C., and rapidly converted into the hydrochloride by the hydrochloric acid of the stomach. The salt contains 10 per cent. of plasmoquine base. Dr. Rohl tried Plasmochin in the treatment of *Proteosoma* infection in canaries, and this led Professor Soili of Dusseldorf to use it in the treatment of induced malaria in cases of general paralysis. Finally, Professor Mühlens of Hamburg carried out an extensive series of trials with the drug in cases of naturally acquired malaria, and read a paper at the conference of Naturforscher und Artze at Dusseldorf in September, 1926.

Plasmochin is thus another triumph of German synthetic chemistry, and promises to be an outstanding landmark in the therapeutics of tropical medicine.

In the investigation of this drug we selected only those cases of malaria which showed malarial parasites in the blood. Before beginning the treatment, a complete blood examination was done as shown in Table I, and the patients were given Plasmochin according to the directions of the manufacturer.

The drug is put up for administration in tablet form in two varieties: Plasmochin, each tablet containing 0·02, grm. of the drug, is recommended for benign tertian and quartan infections, one tablet three times a day; and Plasmochin Co., each tablet containing 0·01 grm. of the new drug and 0·125 grm. of quinine sulphate is recommended for malignant tertian infections. All the cases under investigation were given only the tablets of the new drug and no other medicine whatsoever. A daily count of the malarial parasites in the blood was made and the counts to be of value for purposes of comparison were always done with a definite and known quantity of blood. Blood was taken by the hæmocytometer pipette up to the mark 0·5 c.mm. and the counts were made on this known quantity of 0·5 c.mm. of blood by film and drop methods. In a few cases cultures were made from the blood before and after treatment; and we found that no culture could be grown from blood after treatment with Plasmochin. However it was found that cultures could not be grown from blood which did not show parasites microscopically, either by the film or drop method; and therefore for the purposes of this paper, cultures were not made in every case. It is interesting to note here, however, that cultures made in Case 10 (cf. Tables I and II) of our series showed that all the amœboid forms in the blood developed into crescents, and none went into schizogony. The infection in this case was most virulent and 2,365 malarial parasites were counted in 0·5 c.mm. of blood.

Clinical notes were kept and the urine was examined every day and the drug in many cases has been prescribed even in the presence of complications. We have observed no untoward effect of the drug on any system or organ.

The drug begins to act within 24 hours and under its action the malarial parasites immediately disappear; within 5 or 6 days the blood is free from malarial parasites. (*Vide* Table II.)

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TABLE I.

J. J. Hospital, Ward XIV. *Examination of Blood of the Patients on admission.*

		Total number of red blood corpuscles per c. mm.	Total number of w.b.c.'s. per c. mm.	Hæmoglobin per-centage.	Colour index.	Differential Leukocyte count.				Variety of Malarial Parasites.	Number of Parasites per 0·5 c.mm. of blood.	Van den Bergh reaction on blood serum direct and indirect.	
						Polymorphs.	Lymphocytes.	Hyalines.	Eosinophiles.				
5043	Manigan Ganda Swami.	2,200,000	5,600	50	0·9	68	16	14	2 %	B. T.	95	—	+
5171	Gulam Rasul Syed Imam.	1,880,000	7,400	45	0·8	70	15	12	3 %	B. T. & M. T.	107	—	—
5248	Mohemad Shohela	3,780,000	4,800	80	0·8	58	24	14	4 %	Quartan.	178	—	—
5259	Daudmiya Fakir Ahmed.	3,200,000	5,200	70	0·8	60	22	15	3 %	B. T. & M. T.	**301·76**	—	+
5349	Durming Fernandez.	3,000,000	4,400	60	1	58	28	12	2 %	M. T.	**347·203**	—	—
5360	Riawat Sadal ..	4,200,000	6,400	80	1	64	23	11	2 %	B. T. & M. T.	287	—	—
5408	Haibulla Khairati	3,800,000	6,000	80	0·9	61	25	12	2 %	B. T.	237	—	—
5410	Mohamed Ismail	4,000,000	6,200	85	0·9	60	23	14	3 %	M. T.	98	—	—
300	Mustafa Bahebkhan.	3,200,000	5,800	70	0·9	58	23	16	3 %	M. T.	**110**	—	+
716	Fazirulla Sharfulla.	3,450,000	6,400	70	0·9	54	27	17	2 %	M. T.	2365	—	+
584	Mohamed Noor Gulam.	2,860,000	3,700	60	0·9	68	14	16	2 %	B. T. & M. T.	**183·33**	—	+
632	Abdul Rehman Karim.	4,000,000	4,800	80	1	61	25	11	3 %	Quartan.	440	—	—
464	Sambhunath Kaluram.	2,880,000	4,550	60	0·9	71	17	9	3 %	Quartan.	296	—	—
884	Alkhan Azee ..	3,900,000	6,340	80	0·9	60	23	15	2 %	M. T.	**165·57**	—	—
114	Najumiya Hasumiya.	4,200,000	4,750	85	1	59	26	14	1 %	B. T. & M. T.	**210·67**	—	—

TABLE II.

Daily count of the number of malarial parasites in 0.5, c.mm. of blood, from the day of the commencement of treatment.

Serial No.	Reg. No.	Name.	Kind of parasites.	1st day.	2nd day.	3rd day.	4th day.	5th day.	6th day.	7th day.	8th day	9th day.	10th day.	Next week.
1	5043	Manigen Ganda Swami.	B. T.	95	65	27	7	2	nil	nil	nil	nil	nil	nil
2	5171	Gulam Rasul S. Imam.	B. T. & M. T.	107	56	37	8	1	..	..	..	..	..	..
3	5248	Mohemad Sohela	Quartan	178	95	37	12	2	nil	nil	nil	nil	nil	nil
4	5259	Daudmiya Fakir Ahmed.	B. T. & M. T.	301	103	33	5	nil	nil	nil	nil	nil	nil	nil
			Crescents	76	47	29	17	11	7	3	nil	nil	nil	nil
5	5349	Durming Fernandez.	M. T.	347	127	43	15	5	2	nil	nil	nil	nil	nil
			Crescents	103	59	30?	17	10	7	5	2	nil	nil	nil
6	5360	Riawat Sadal ..	B. T. & M. T.	87	30	12	3	nil	nil	nil	nil	nil	nil	nil
			Crescents	22	11	7	5	2	2	nil	nil	nil	nil	
7	5408	Habibulla Khairati	B. T.	237	165	61	18	8	1	nil	nil	nil	nil	nil
8	5410	Mohamed Ismail	M. T. & B. T.	98	43	20	9	2	nil	nil	nil	nil	nil	nil
9	300	Mustafa Bahebkhan.	Crescents	110	71	60	43	27	14	9	4	2	2	nil
10	716	Fazirulla Sharfulla.	M. T.	2365	960	503	200	47	18	7	nil	nil	nil	nil
11	584	Mohamed Noor Gulam.	B. T. & M. T.	183	100	43	21	9	3	1	nil	nil	nil	nil
			Crescents	33	21	15	10	5	2	2	1	nil	nil	nil
12	632	Abdul Rehman Karim.	Quartan	440	189	90	33	7	1	nil	nil	nil	nil	nil
13	464	Sambunath Kaluram.	Quartan	296	150	43	18	5	2	nil	nil	nil	nil	nil
14	712	S. A. Dandeker..	B. T.	95	45	22	11	3	1	nil	nil	nil	nil	nil
16	884	Alkhan Azee ..	M. T.	165	100	64	29	9	3	nil	nil	nil	nil	nil
			Crescents	57	29	18	11	5	2	2	1	nil	nil	nil

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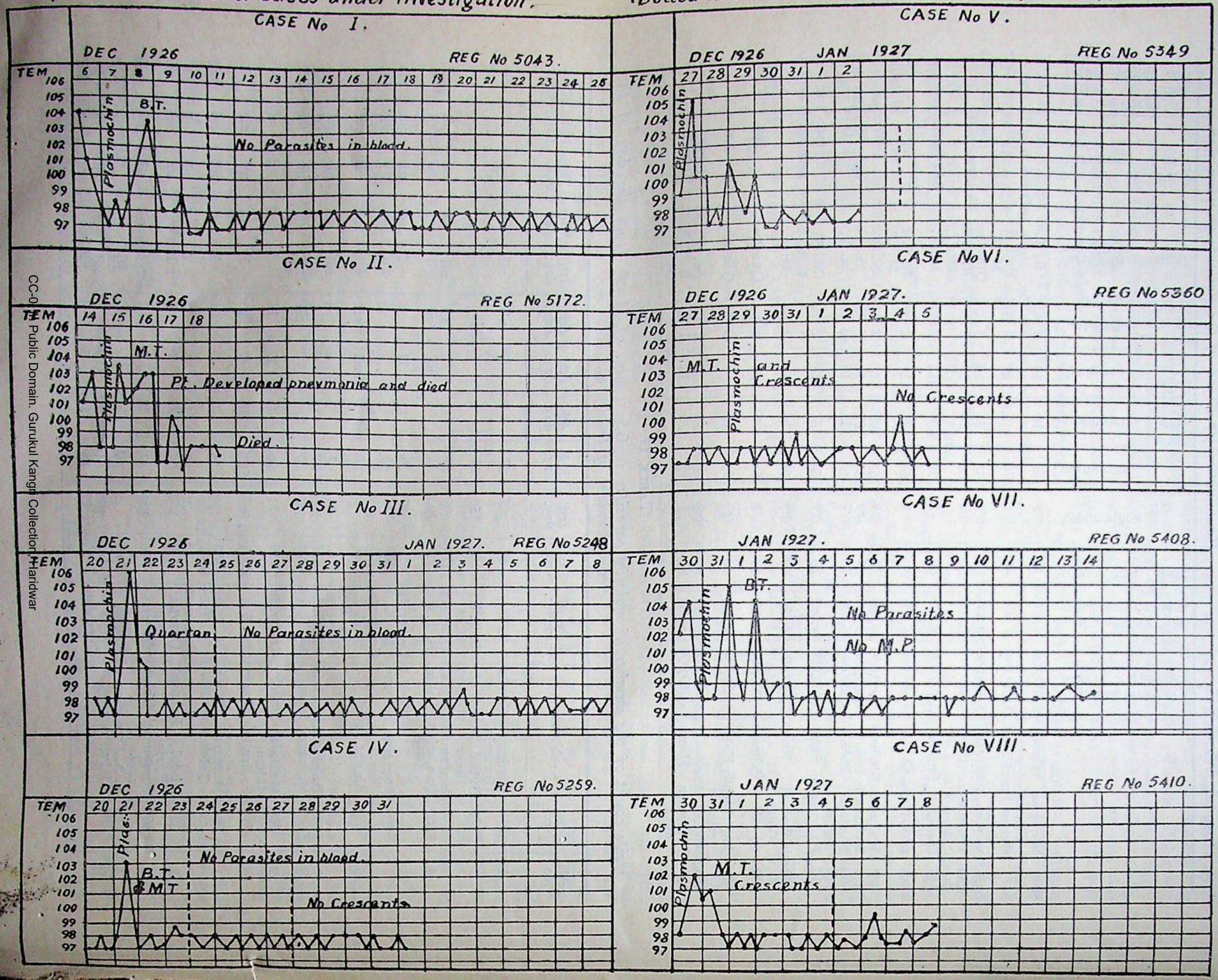
Temperature charts of cases under investigation. Dotted line in the chart indicates the day of disappearance of parasites.



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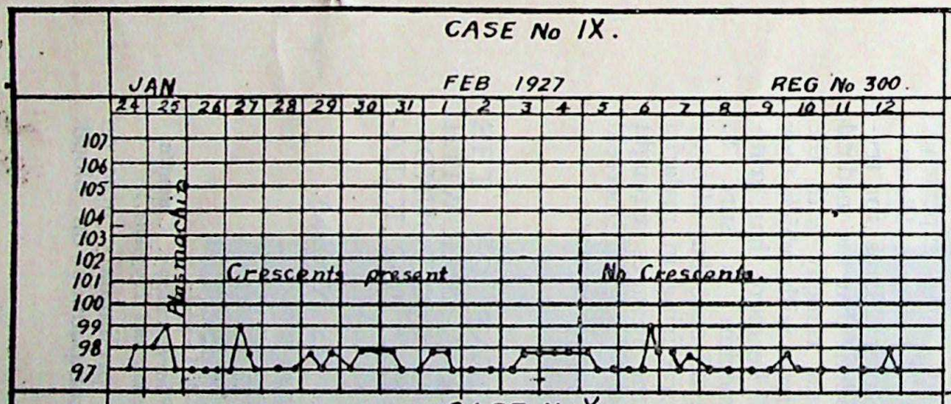

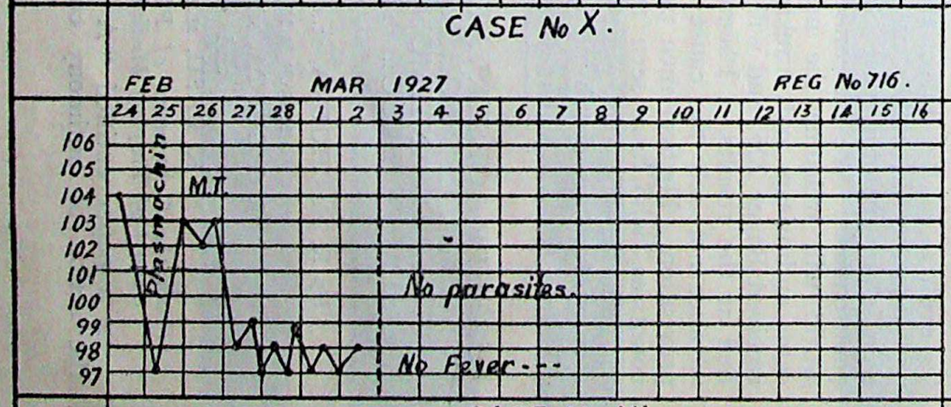

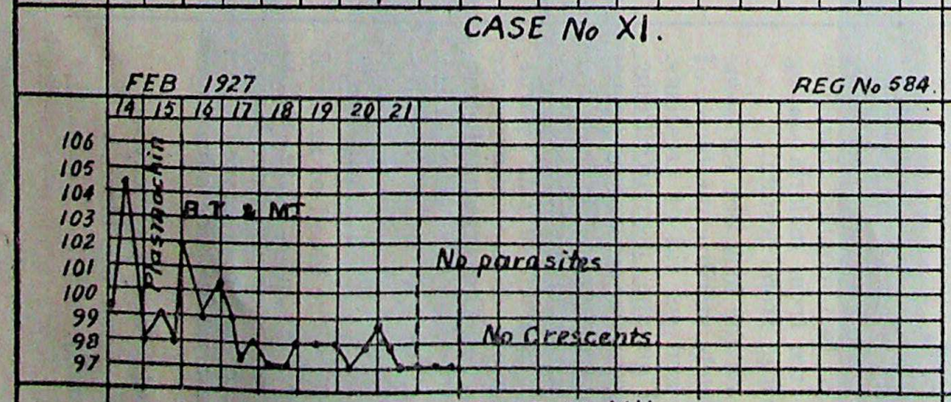

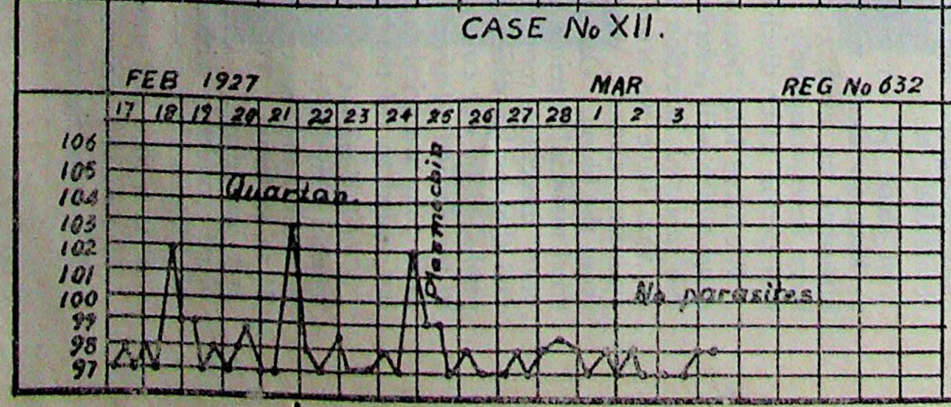

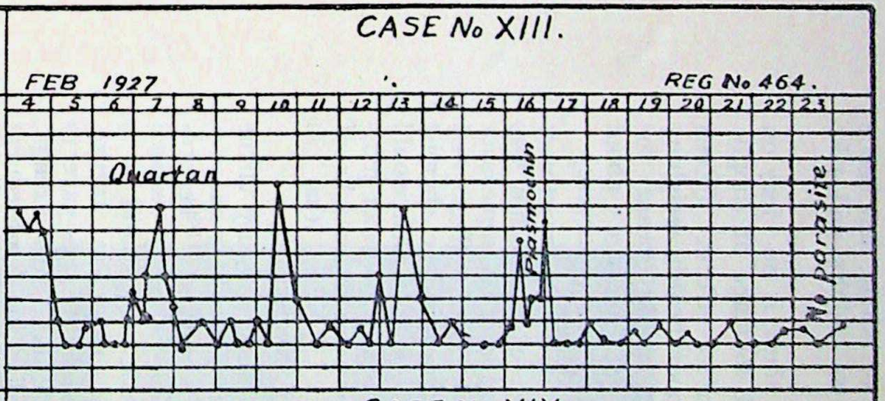

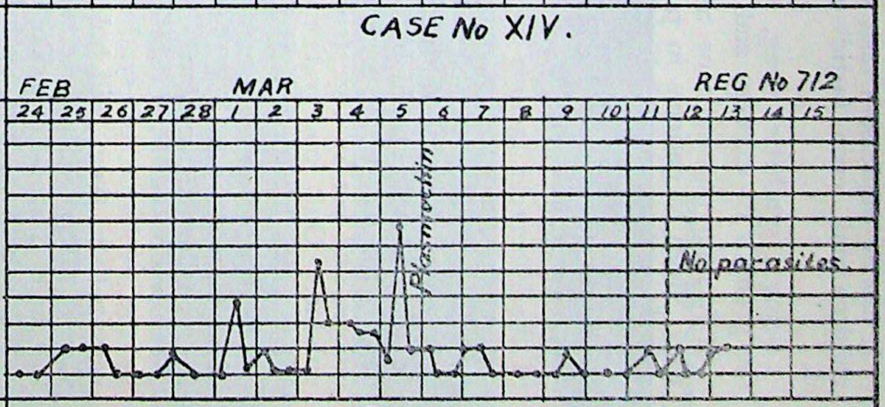

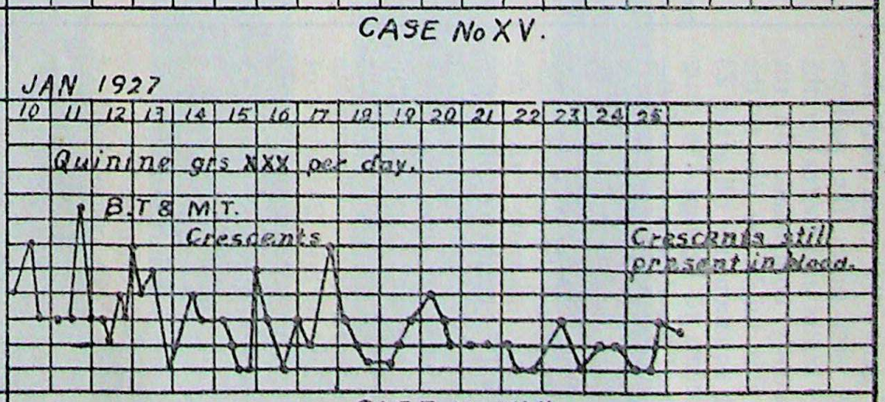

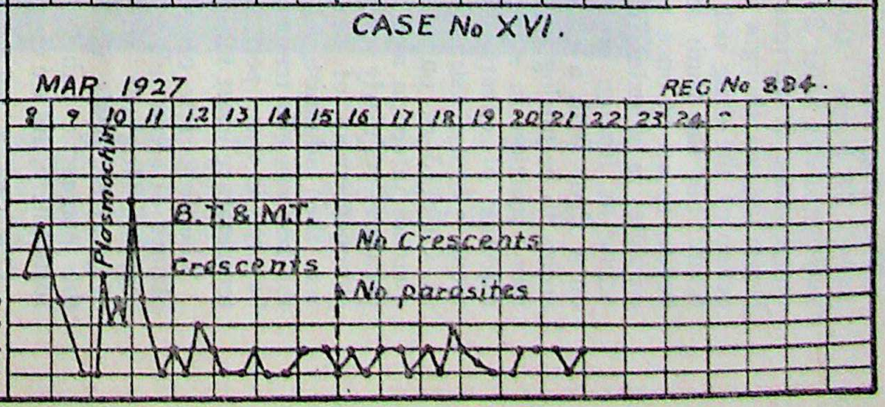

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The temperature is generally controlled also within 24 hours. But sometimes the patients may get a rise after 24 hours and thereafter the temperature is permanently controlled. In the beginning we thought this might be due to the action of the drug not commencing till after 24 hours, but the truth seems to be that the drug begins to act at once and the destruction of the parasites is so extensive that the dead parasites, acting as foreign proteins in the blood, being on a rigor with a rise of temperature. This seems to be analogous to the Jarisch-Herschheimer reaction in syphilis, following after the injection of salvarsan. The truth of this statement is best illustrated in the temperature chart of Case 13 of our series. It was a case of quartan infection and there was a rise of temperature regularly every 72 hours before the commencement of the treatment. Plasmochin was then administered and within 24 hours of the last rise the temperature went up once again before it was permanently checked. Every temperature chart tells a similar story.

The first few of our cases invariably complained of some dull aching pain in the epigastric region. However when we administered the drug after meals, none of them complained of this epigastric pain. In none of our series, fortunately, did we observe any cyanosis or pallor.

One case, a patient who came to the hospital for malaria and diarrhœa was put on this treatment; his malaria was controlled, but he developed pneumonia and died. An autopsy was not obtainable.

In some of our cases where it was possible to keep in touch with the patients, they have informed us, even after two months, that they have been completely free from malaria during this period after discharge from hospital.

We have long been on the look out for some drug which will completely sterilize the blood of the malarial infection and get rid of crescents. In vain have we tried quinine, mercurochrome, antimony tartrate, etc., to get rid of crescents from the blood. Other workers in the field have tried malarial vaccines but without success. Last year, mercurochrome was tried in our wards, and the results which were disappointing, were published by our colleagues, Dundas and Telang, in the *Indian Medical Gazette* for March, 1926. Last year we tried antimony tartrate injections but failed to rid the blood of crescents.

Conclusions.—Our conclusions are that Plasmochin completely sterilizes the blood of malarial infection and controls the temperature within 24 to 48 hours. The results obtained are lasting and immediate. Crescents are removed from blood completely within a week. The advantages of Plasmochin are:—

It is a sure and quickly acting remedy.

It removes crescents from the blood.

It is administered orally.

It has no unpleasant taste or odour, and hence children and even fastidious adults will take it.

Being a synthetic drug, there is no fear on the grounds of expense and shortage of supply.

It has no untoward or after effects. (Even when given to patients in poor health, weighing only 5 or 6 stone, in doses really meant for Europeans weighing on an average about 10 stone, no untoward effect was observed.)

Dr. Horlein, Director of the drug department of the Elberfeld factory where Plasmochin was evolved, points out that quinine is so unpleasant to take, has such troublesome after effects and is so expensive that the ever optimistic chemist felt that a drug should be evolved which would destroy the malarial crescents which infect mosquitoes and yet be free from the drawbacks of quinine. Our observations indicate that in Plasmochin this ideal is well realised.

The days of quinine are numbered. By virtue of its surpassing merits Plasmochin has successfully challenged the place of quinine. The prophetic vision of Paul Ehrlich is being realized by the evolution of synthetic drugs and it is certain that they will hold sway in future. Ehrlich, after 605 unsuccessful attempts gave to the medical world his 606th successful attempt, called salvarsan, for syphilis. In subsequent years, his school gave us Bayer 205 for trypanosomiasis; and it is a tribute both to Ehrlich and synthetic chemistry that the new drug should be evolved in his fatherland. Our experience with Plasmochin makes us realize that Plasmochin is for malaria what Bayer 205 is for trypanosomiasis. We are confident that the medical world will welcome the new remedy with the same enthusiasm and frankness with which they received Bayer 205, and will be more than gratified at the results. Plasmochin is sure to advance not only the cause of cure but also of prevention. Medical men practising in malarial countries, who have seen the ravages wrought by malaria, will feel grateful to the Elberfeld factory for this epoch-making discovery.

FURTHER OBSERVATIONS ON THE SERUM TEST FOR KALA-AZAR WITH ORGANIC ANTIMONY COMPOUNDS. A SIMPLE BLOOD TEST FOR KALA-AZAR.

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MAJOR, I.M.S.,
J. C. GUPTA, M.B. (Cal.),
and
N. K. BASU, M.B. (Cal.).
(*From the Department of Pharmacology, Calcutta School of Tropical Medicine and Hygiene.*)

IN a paper entitled "A preliminary note on the action of antimony compounds on blood.

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PLATE IX.

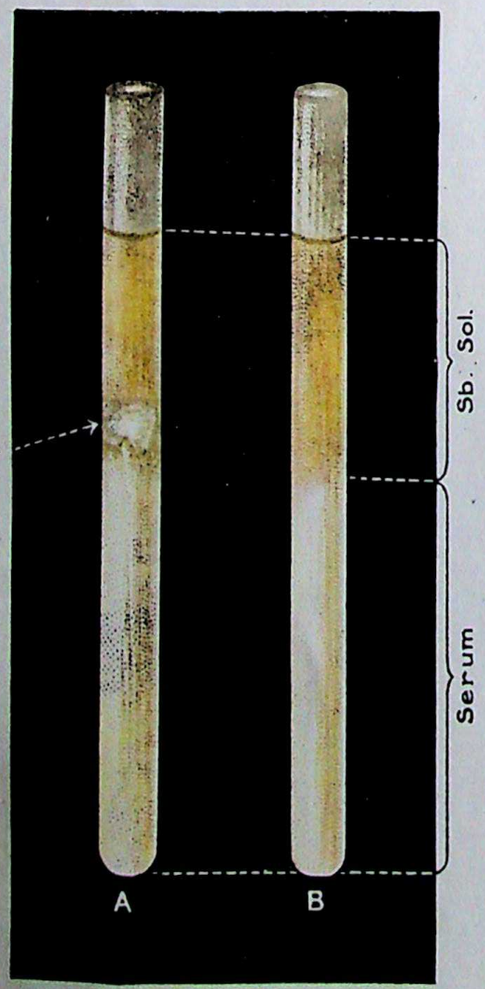

Fig. I.—*Serum Test.*
(A) Kala-azar serum—note the precipitate at the junction.
(B) Non-Kala-azar serum—no precipitate at the junction.

Fig. II.—*Blood Test.*
(A) Kala-azar blood—immediately after antimony solution is added—note flocculent precipitate forming.
(B) Same—after a few minutes—precipitate settling down.
(C) Same—after a few hours—precipitate settled down at the bottom.
(D) Non-Kala-azar blood—no precipitate is formed.

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A new serum test for kala-azar," published in the *Indian Medical Gazette* for June 1927, we pointed out that the precipitation, produced when solutions of certain organic compounds of antimony were brought in contact with the serum of kala-azar patients, was of a specific nature and that it could be used as a diagnostic test for kala-azar. The technique of this test was described and its advantages over the aldehyde test were discussed in that paper.* (Plate IX, fig. A and B.) Napier in a paper entitled "A new serological test for kala-azar," which appeared in the *Indian Medical Gazette* for July, 1927, extended these observations to a large number of kala-azar cases and controlled the efficacy of this test by means of spleen puncture examinations of patients, in addition to the aldehyde test which was mostly used in our series of cases. He corroborated our conclusions regarding the specific nature of this test. He also tried different dilutions of these compounds and concluded that it was preferable to use weaker concentrations of antimony compounds than those that were recommended by us. In most of his experiments, serum was kept for 24 hours in a cool room before the application of this test.

Our observations show that although 0·005 per cent. solutions of antimony compounds give a positive reaction immediately, it is advantageous to use 1 to 4 per cent. solutions as the precipitate thrown down with weaker solutions is not so dense, flocculent and distinctive. With weaker solutions there is a possibility of overlooking the early cases of the disease. Further we are of opinion that it is unnecessary to keep the serum in a cool room for 24 hours unless it is for the sake of convenience. The test can be applied quite as effectively to fresh serum, and this in our opinion is an advantage as it makes the reaction a quick and simple diagnostic measure. We did not find any particular advantage in keeping the serum for 24 hours in a cool room.

Since our first paper was published we have largely extended our observations to kala-azar and other sera and are carefully inquiring into the composition of the precipitate formed and the causes of this precipitation by working out such factors as the hydrogen-ion-concentration, the viscosity, the conductivity, the gold number, etc., of different sera. The details of this work we hope to publish shortly. In this paper we give further data to show the efficiency of this test, and its advantages over the aldehyde test. We also describe a very simple blood test for the diagnosis of kala-azar which can be easily performed with little equipment or cost.

In Table I we have given details of 129 sera which we have examined by this test. We found the urea antimony compounds gave the best reaction for the purpose of this test and in this series of cases we have used them entirely. The three preparations, urea-stibamine, stiburea (urea-stibamine, Union Drug Co.) and amino-stiburea were equally effective. It will be observed that of the 70 kala-azar sera tested with the antimony test, all (100 per cent.) gave strongly positive reactions; when the same sera were tested with the aldehyde test only 60 (85·6 per cent.) gave strongly positive reactions (Column 2). Out of the remaining 10, four gave a doubtful positive aldehyde reaction and six were entirely negative; among the latter, five were sera from patients with early kala-azar ranging from 3 weeks to 2 months in duration. The sera of these patients gave a strongly positive antimony test, while the aldehyde reaction was absolutely negative. The final diagnosis of these five early cases was confirmed by peripheral blood cultures for flagellates. The sixth case was a patient with a history of fever of two weeks duration in whom unfortunately the medical practitioner in charge

TABLE I.

1	2 Kala-azar.				3 Leprosy.				4 Malaria.				5 Normal blood and other cases like filaria, syphilis. (etc.)				Remarks.
	No. done.	+++	±	—	No. done.	+	±	—	No. done.	+	±	—	No. done.	+	±	—	
Amino-stiburea, Stiburea and Urea-stibamine ..	70	70	—	—	35	—	2	33	14	1	—	13	10	1	—	9	
Aldehyde reaction..	70	60	4	6	35	7	4	24	14	-	1	13	10	—	—	10	

* *Technique*—The serum separated from the blood is pipetted out in a capillary tube and put into a Dreyer's tube. A 4 per cent. solution of one of the antimony compounds—preferably urea compounds—is slowly added along the side of the tube to form a layer on the top. With kala-azar serum a thick flocculent precipitate forms at once, while with the other sera there is either no precipitate whatever or only a slight precipitate at the junction of the two.—(Chopra, Gupta and David: *I. M. G.*, Vol. 62, No. 6, June 1927.)

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started antimony injections before the blood could be taken for cultural examination. This case was clinically kala-azar, reacted well to antimony injections and was cured after the course.

In column 3 the results obtained with sera from 35 lepers in different stages of the disease are given. It will be seen that 33 (94·29 per cent.) gave a definitely negative antimony test and the remaining two gave a doubtful positive reaction. When the same sera were tested with the aldehyde test, 24 (69·5 per cent.) were negative and of the remaining eleven, 7 (20 per cent.) gave a positive, test and four (11·4 per cent.) were doubtfully positive. Dr. Muir informs us that some of the advanced leprosy cases give a strongly positive aldehyde reaction, though they are definitely non-kala-azar. We are grateful to Dr. Muir for supplying us with a number of sera from such cases which we have included in Table I. Though the aldehyde test in five such sera was positive the antimony test was definitely negative with three, and in the remaining two a slight opalescence or a faint precipitate was noticed at the junction of the two fluids, which dissolved on standing for some time, generally half an hour. These we have classed in the table as ± or doubtfully positive reactions. The appearance of the precipitate was totally different from the thick flocculent precipitate occurring with kala-azar sera.

Column 4 gives the results of our observations with 14 sera from patients suffering from malaria. It will be seen that 13 were definitely negative, while 1 gave a moderately positive antimony test. This patient gave a previous history of having had 60 antimony injections and he also gave a doubtful aldehyde test. We have already observed in our previous paper regarding this test that rarely cases of chronic malaria with enlarged spleen give a positive antimony test. It is difficult to say with any degree of certainty whether there is any kala-azar element in these cases or not, but the density and the character of the precipitate, if carefully observed, help in differentiating them from true cases of active kala-azar.

Column 5 gives the results obtained with 10 sera from patients suffering from filariasis, syphilis, skin diseases, etc. It will be seen that one case gave a positive antimony test. This was a case of acute streptococcal dermatitis who gave no previous history of injection of antimony; the aldehyde test was negative with all.

A Simple Blood Test for Diagnosis of Kala-azar.

While working at the antimony test we have been trying to simplify it so that any medical practitioner could perform it in the field and confirm the diagnosis he has made clinically without any elaborate technique. In this we have fortunately succeeded.

Technique.—All that is required are a 2 per cent. solution of potassium oxalate, a 4 per cent. solution of a urea antimony salt such as urea-stibamine, two small test tubes and a few Dreyer's tubes, which simply consist of 2-inch pieces of glass tubing 3 to 4 mm. in diameter sealed at one end. Both the potassium oxalate and antimony solutions once made can be stored for a month or even longer in glass stoppered bottles. One or two drops of blood obtained from a finger pricked with a needle are allowed to mix well with about 0·25 c.c., of a 2 per cent. solution of potassium oxalate. This can be easily done by putting the mouth of the small test tube containing the oxalate solution firmly against the tip of the cleaned and pricked finger from which the blood is oozing and inverting the tube 2 or 3 times over it. Alcohol should not be used for cleaning the finger as if some of it gets into the oxalated blood solution a precipitate is formed.

A little of this solution is transferred into a Dreyer's tube and a 4 per cent. solution of the antimony compound is added by means of a capillary pipette along the side of the tube. The heavy antimony solution sinks to the bottom, and in cases of kala-azar a flocculent precipitate forms almost immediately at the junction of the two fluids (Fig. II A). This precipitate soon settles down at the bottom of the tube with the red corpuscles entangled in it (Fig. II, B and C). In very early cases of kala-azar the precipitate may take 10 to 15 minutes, very rarely 1 to 2 hours to appear, but in well developed cases it appears almost immediately after the solutions are mixed. The precipitate is obvious to the naked eye but the use of an ordinary magnifying hand lens is helpful in doubtful cases.

It should be mentioned here that solutions of potassium oxalate stronger than 2 per cent. by themselves form a precipitate with the antimony compounds even in the absence of kala-azar blood. Solutions weaker than 2·0 per cent. do not give satisfactory results. 0·25 c.c., of oxalate solution is just enough for one or two drops of blood; the greater the quantity of oxalate solution, correspondingly larger would be the amount of blood that will be required.

This simple test has great possibilities as it can be applied in the field on a very large scale in areas in which kala-azar is prevalent. The test, like the antimony serum test, is given by early cases of the disease and we have no doubt it will help the kala-azar centres in the rural areas to diagnose very early cases of the disease. Further possibilities of this test are under investigation.

Table II gives the results of 138 cases examined with the blood test. Column 2 shows that all the 54 kala-azar patients gave strongly positive antimony reactions (100 per cent.), when the same patients were tested with the aldehyde reaction, 51 (94·4 per cent.) gave strongly positive reactions and the remaining 3 were

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TABLE II.

1	2 Kala-azar.				3 Leprosy.				4 Malaria.				5 Normal blood and other cases like filaria, syphilis (etc.)				Remarks.
	No. done.	+++	±	—	No. done.	+	±	—	No. done.	+	±	—	No. done.	+	±	—	
Amino-stiburea Stiburea and Urea-stibamine ..	54	54	—	—	20	—	—	20	14	—	—	14	50	—	—	50	
Aldehyde reaction..	54	51	3	—	20	—	2	18	14	—	—	14	50	—	—	50	

doubtfully positive. Column 3 gives the result of blood examinations of 20 lepers. All gave negative results; the same specimens examined with the aldehyde test gave 18 negative and 2 doubtfully positive reactions. Columns 4 and 5 give the result of blood examination of cases of malaria and miscellaneous diseases. In all these the blood test as well as the aldehyde test were negative.

SUMMARY AND CONCLUSIONS.

1. Further observations on 129 sera show that the serum antimony test for kala-azar is of great diagnostic value.

2. The percentage of positive reactions with this test with kala-azar sera is higher than with the aldehyde reaction performed with the same sera.

3. Its advantages over the aldehyde test are firstly, that a smaller quantity of serum is required, secondly, that it gives immediate results, and thirdly, it is positive in early cases of the disease when the aldehyde test is still negative or doubtful.

4. Some of the advanced cases of leprosy—definitely non-kala-azar—give a positive aldehyde reaction, but the antimony test is generally negative.

5. Rarely, chronic cases of malaria with enlargement of the spleen may give a positive antimony test; the precipitate however is not so dense and flocculent as is the case with kala-azar serum.

6. A still simpler and more rapid diagnostic test for kala-azar has been worked out. One or two drops of blood from a finger prick are received into 0·25 c.c. of a 2 per cent. solution of potassium oxalate and the test performed in the same way as with the serum. The results obtained with this test run parallel with those obtained with the serum test. This test is simple, rapid and economical, and is capable of application in the field on a very large scale.

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SOME OBSERVATIONS ON APPENDICITIS AMONG INDIAN WOMEN.

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and

MISS G. P. PATEL, W.M.S.

Is appendicitis common among Indian women?

There is a belief in some quarters of the medical world that appendicitis is not common among Indians.

With a view to collecting information as to the frequency of the disease among *Indian women*, we set about collecting specimens and trying to ascertain the causative factor in each case. The task was greatly facilitated by the fact that the senior author was able to provide the appendices in sterile tubes, removed under such aseptic precautions as a modern surgeon is capable of. Details were also available of the patients' histories and of the nature of the operations undergone.

A series of 25 such removed appendices was examined microscopically and bacteriologically. One interesting feature which immediately presented itself was the frequency of roundworm infection (*Oxyuris vermicularis*) of the appendix; no less than 14 out of the 25 appendices showed from 1 to 7 roundworms apiece.

A second feature was the presence in 23 of fæcal matter, varying in amount; some appendices showed the presence of fæces throughout the whole lumen; in others there were fæcal collections either at the tip or in the middle, producing bulbous expansions, with corresponding injection of the blood vessels on the peritoneal surface.

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Cultures were taken—usually from the tip, middle, and base—and especially with a view to isolating any dysenteric organism in cases which gave a history of previous diarrhœa. These gave a growth of *Bacillus coli.*

One only of the 25 appendices showed tuberculous infection. Considering the frequency of tuberculous peritonitis in Delhi, this figure is unexpectedly low.

Symptoms.—All 25 patients complained of abdominal pain to a variable extent in the lower half of the abdomen, and occasionally in the epigastrium and umbilical region. Sixty-five per cent. were admitted for dysmenorrhœa; 52 per cent. had primary sterility; in fact all the patients came for one or other gynæcological complaint, except one unmarried patient who complained only of pain in the lower part of the abdomen.

Caste.—The distribution with regard to caste was as follows:—

Hindus 17.
Mahomedans 7.
Indian Christian 1.

The higher percentage of Hindus may be merely the result of more Hindu than Mahomedan patients attending the hospital.

In addition to the appendicectomy, various other operations, such as Gilliam's, salpingostomy, salpingectomy, resection of the ovary, dilatation and curetting, and in one instance hysterectomy, were carried out on these patients.

The points that one would like to have cleared up are:—

(1) What is the cause of this reflux of fæcal contents into the appendix?

(2) Is it the fæces which irritate the mucous membrane of the appendix, and is the presence of threadworms merely a result of the mechanical reflux of fæces into the appendix?

(3) Do other hospitals in India have similar findings in their series of cases of appendicitis *in women?*

(4) Knowing how frequent is the presence of helminthic infection in the tropics, what is the normal incidence in adult Indian women of infection with *Oxyuris vermicularis?*

GLAND PUNCTURE FINDINGS IN LEPROSY.

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DIFFERENT observers (Pineda quoted by Wade(1), Rosentul and Kruglak(2), Serra(3) and others), have noted the presence of lepra bacilli in the lymphatic glands of lepers and of supposedly healthy persons living in association with them. The percentage of positive findings recorded by different observers shows considerable variation. Pineda found 9 positive in a series of 53 ex-lepers about to be discharged: Rosentul and Kruglak examined 64 cases, of whom 26 were cases of "lepra tuberosa," 16 of "lepra mixta" and 22 of "lepra maculo-anæsthetica:" positive results were obtained in 100 per cent. of the nodular and mixed cases and in 95 per cent. of the maculo-anæsthetic cases. Previous treatment appeared to have no effect on the bacteriological findings. In Serra's series of 33 cases, 8 showed lepra bacilli in the gland juice and pulp.

None of the workers quoted above gives any accurate indication of the type and stage of the disease in the patients examined by him. We have recently performed gland puncture in a series of male patients attending the out-patient department at the School of Tropical Medicine, Calcutta. The inguinal or femoral glands were chosen as the seat of operation in all cases: this series is quite unselected, each man was examined as he appeared at the out-patient department. A total of 93 cases were "punctured:" of these, 57 have been under treatment for varying lengths of time, while the remaining 36 had not been subjected to treatment prior to the operation. Taking the former group first, Table I shows the type and stage of the disease according to Muir's classification(4), together with the gland puncture findings.

TABLE I.

Type and Stage of disease.	No. of cases examined.	No. +ve.	% +ve of cases examined.
A1	41	2	4.9
A2	5	0	0
B1	5	3	60
B2	4	4	100
B3	2	2	100
Total cases	57	11	19.3

The number of positive punctures in the apparent A1 cases was originally 4, but considerable doubt arose as to whether the type and stage of the disease present at the time of gland puncture was the same as that noted on the case-cards at the time of first attendance. In order to clear up this point, careful bacteriological examination of the skin was made in the 4 positive cases, resulting in the finding of bacilli in 2: such cases had obviously progressed to some extent subsequent to first attendance and the number of positive cases in the A1 series is therefore only 2.

Turning now to the second group, Table II shews the type and stage of the disease together with gland puncture findings in the 36 previously untreated cases.

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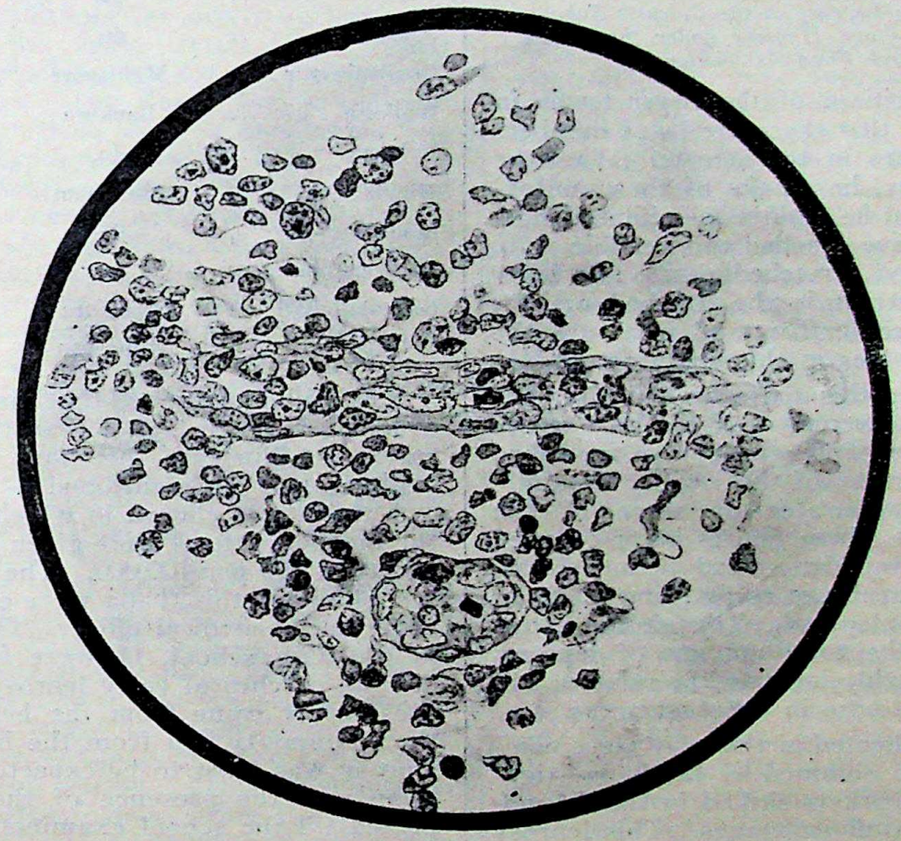
TABLE II.

Type and Stage of disease.	No. of cases examined.	No. +ve.	%+ve of cases examined.
A1	19	2	10.5
A2	1	0	0
B1	5	3	60
B2	7	7	100
B3	4	4	100
Total cases	36	16	44.4

Unless lymphatic glands are relatively heavily infected, the operation of gland puncture may not reveal the presence of bacilli: in order to test this point, and as a preliminary to a more extensive study of the histo-pathology of the glands in leprosy, an inguinal lymphatic gland was removed under local anæsthesia from each of 7 patients in various stages of the disease. In one of these in whom the gland puncture done a few days previously had been reported "negative," a few scattered bacilli were found on microscopic examination of sections. The microscopic appearances of the affected glands are of some interest. There was in practically every case considerable endothelial proliferation, large ovoid cells with pale vesicular nuclei being found not only within the lumina of blood vessels—especially in the medulla—but also lying free among the true lymphoid elements.



Further work on these lines is proceeding.

From this small series of cases it seems justifiable to draw the following conclusions:—

(1) In a small proportion of early (A1) cases lepra bacilli can be recovered from the lymph glands at a time when careful bacteriological examination of the skin is negative.

(2) As the disease advances up the curve into the "B" area, the percentage of positive findings rises rapidly to reach a maximum in the advanced B2 and B3 cases.

(3) In the late (A2) stage there is again a diminution in the incidence of lepra bacilli in the glands, coincident with the fall in the number of organisms throughout the body generally. It should be noted however that only 6 out of a total of 93 cases were of the A2 class so that further work on this type of cases is necessary before any definite conclusion can be drawn.

(4) Unless a gland is relatively heavily infected, gland puncture may fail to show bacilli: it cannot therefore be recommended as an accurate diagnostic procedure in early cases. It is rarely employed as such: at this stage clinical evidence is usually sufficient to establish a diagnosis.

(5) The percentage of positive findings appears to be somewhat larger in untreated than in treated cases.

I am indebted to Dr. E. Muir, Research Worker in Leprosy under the Indian Research

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Fund Association for permission to publish these notes, and to Drs. E. Landeman and T. N. Roy for assistance in collecting cases.

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LEPROSY IN THE BENGAL-BIHAR BORDER LINE.

By E. MUIR, M.D., F.R.C.S. (Edin.),

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The average citizen of the larger towns in Bengal is aware that there are large numbers of begging lepers in the streets. When he thinks of leprosy, he thinks of these unfortunate people, but he seldom asks himself how and why they have reached this terrible state of deformity and wretchedness? The leper beggar of the street is the finished article; where does he come from and what are the stages and processes in this manufacture?

In investigating this subject, the writer had recourse firstly to the returns of the 1921 census and secondly to figures which were furnished through the courtesy of the Deputy Commissioners and Magistrates of some of the districts affected. These figures were collected by unskilled chaukidars and enumerators who were only capable of recognising the more advanced cases of leprosy. They do not therefore represent the total amount of leprosy, though they roughly indicate the relative frequency of the disease in different areas.

The figures collected in this way were compared with those obtained by local investigations made by workers skilled in the diagnosis of leprosy in all its stages. This leprosy survey is still going on, but the results already obtained are so interesting and important that I think it well to put forward a preliminary note on the subject. A general paper on this subject has already appeared in the July 1927 number of the *Indian Journal of Medical Research*, but the present note is confined to work in one particular tract, viz., the thanas lying near the Bengal-Bihar border line. This particular area has been chosen because it appears to contain more leprosy than any other in India.

The districts affected are the Sonthal Parganas and Manbhum on the Bihar side, and Birbhum, Burdwan, Bankura and Midnapore on the Bengal side.

According to the unskilled census, by far the most leprous area is comprised of the thanas of these districts which lie along the line dividing the two provinces.

The following table, drawn from the figures of the unskilled census, shows some of the thanas in which the incidence is highest:—

Thanas.	Districts.	Lepers per 100,000 of inhabitants.
Jarmundi Bazar ..	Sonthal Parganas	2,880
Dhanghara ..	do.	1,140
Patjor ..	do.	1,000
Ranga ..	do.	967
Benagaria ..	do.	940
Khajuri ..	do.	924
Sugaria ..	do.	923
Asna ..	do.	903
Amba ..	do.	824
Gopiballavpur ..	Midnapore	645
Bankura ..	Bankura	636
Indpur ..	do.	423
Nirsha ..	Manbhum	400
Manbazar ..	do.	243
Raghunathpur ..	do.	260
Gangajalighati ..	Bankura	540
Solanpur ..	Burdwan	319

It has been mentioned that the actual number of lepers is much higher than the figures indicate. To illustrate this fact the following instance may be mentioned:—

A thana was chosen in which the figures of the inexpert census were given as considerably less than 300 per 100,000. The boys in a high school within this thana were examined by an experienced medical officer. Of the 300 boys in the high school, 11 were found to have definite patches of early leprosy. These boys presumably came from the better classes of the community and from the homes in which leprosy was least to be expected. In none of them was the presence of the disease suspected till the school examination was made. If leprosy is so common among the better classes how much more common may it be expected to be among the uneducated lower classes of the community, and if 11 out of 300 (almost 3 per cent.) is found in a thana where the unskilled census gives an incidence of under 300 per 100,000 what should we expect to be the actual incidence in thanas where the figure is given at over 2,000 per 100,000 (or 2 per cent.) by the unskilled census?

Of this leprous area in Western Bengal and Eastern Bihar, by far the highest incidence is given in the Dumka and Jamtara sub-divisions of the Sonthal Parganas, as will be seen from the table. While certain thanas of these six districts of Bihar and Bengal furnish the largest number of lepers, there is also a large supply from the Orissa districts of Balasore,

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Cuttack and Puri and from Jalpaiguri and its neighbouring districts, as well as from Nepal.

A fact of great importance in connection with the spread of leprosy is that lepers and prospective lepers are migratory in their habits. Two chief reasons for this may be mentioned:—

(1) The nature of the soil that breeds lepers. This matter has been discussed at length in the article referred to above. It may suffice here to say that the conditions which are favourable for a high incidence of leprosy are those which lead to a precarious livelihood, such as uncertain water-supply and the infertility of the soil, or soil which is highly porous so that water does not remain near the surface and in which the supply of fresh vegetable and fodder for cattle is poor. In such places the inhabitants are driven in bad years to migrate to the more fertile plains where they hire themselves out for agricultural and industrial work. The Bauris and similar low castes among whom there is the highest incidence of leprosy are among those who are the first to migrate under these conditions. Many of these people are suffering from leprosy. Some are infectious cases and others are early non-infectious cases. The latter however, when they come into their new surroundings, change their older and simpler form of life; many of them acquire venereal disease and others malaria. The result is that the more chronic and early forms of leprosy develop rapidly and reach the more acute and infectious stages. Such immigrants moreover tend to crowd together and in such circumstances one infectious case may spread the disease to many.

In the same way students coming from endemic areas to large towns like Calcutta often begin to show the first signs of leprosy under the stress of city life. Statistics show that a large number of the student population of Calcutta is suffering from leprosy. The same thing is also found in those coming for service and for various kinds of industrial work to Calcutta: some bring the infection with them and develop the disease in Calcutta, others are infected because of the bad housing and living conditions in the large city.

(2) Another type of leper which migrates from the leprous areas is the deformed end-product, those who are no longer able to work and earn their livelihood and those who have been cast out by their families and friends because of their deformities and disabilities. Many of these were formerly highly respectable citizens till their misfortune drove them to this state.

Of these two classes of migrants, the former is undoubtedly the more dangerous in spreading the disease. Leprosy is seldom spread by street beggars: it is very frequently spread by servants and industrial and agricultural labourers.

I give one or two examples. The other day two brothers, Brahmins from the west of the Burdwan district, came to me, both suffering from early leprosy. The cause was apparent from their story. One day a doctor friend came to visit their house. He was thirsty and asked for water to drink. A servant brought it, but the doctor on seeing him refused to drink the water. The servant was a highly infectious leper though the family had never suspected it. He had served the family for many years. As these two adults had been infected, probably the children of the family, who had been carried about by this servant, will soon show signs of leprosy also.

A young man, a student living in the north of Calcutta, came to me with early leprosy. On enquiry I was told that he was living in the same house with a patient who they said was suffering from early, uninfectious leprosy and had attended our dispensary for a short time some years before. Reference to our books showed that this had been not an early, but an advanced, highly infectious case.

I was asked lately to visit a centre in the south of the Murshidabad district where there was a great deal of leprosy. Enquiry showed that the disease was most rife among the Bauris, that these had migrated from the most leprous part of the Bankura district and that the disease was spreading from them to Mussalmans and others.

Further study of the incidence of leprosy in Bihar and Bengal shows three distinct areas:—

1. The plateaus of Chota Nagpur where the aboriginal lives in his natural security away from the touch of civilization or the outer world.

2. On the fringe of this we have the area to which the aboriginal, multiplying under the ægis of a benevolent British Raj, sends his surplus population—a less healthy area where the savage has his first real contact with the outer world, and the reaction of contact means all the things that make for leprosy, viz., clothes, crowding, poor food, venereal disease, etc. This is the fringe where the raw material from the wilds is heavily infected by leprosy—the border area between Bihar and Bengal.

3. Beyond this there is a broad fringe into which the constantly migrating infection gradually tails off, with areas of increased incidence in the larger cities.

It will be seen at once that the leprosy problem is not one which can be dealt with entirely by district authorities. Leprosy respects no district boundaries. No more does it respect provincial boundaries. If everyone suffering from leprosy in Calcutta could be cured, or segregated to-day, there would be an influx again to-morrow, and this would continue as long as the supply from the borders of Bengal and Bihar continued. As well try to dry with a duster a floor on to which a drain is leaking

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as seek to diminish the lepers in Calcutta and the plains of Bengal by segregation.

How then is the problem to be tackled? Whatever the method, the main effort must be directed toward the source of infection in areas such as I have mentioned. To illustrate the type of work that is suggested, an effort made lately in the thana of Manbazar in the Manbhum district may be mentioned. Two well-trained leprosy workers with three assistants were detailed to make a careful survey of the leprosy in the villages of this thana. They were supplied with a magic lantern and a set of lantern slides illustrating a popular lecture on leprosy. Within four weeks of starting work in this centre, in addition to carrying out survey and propaganda work, they had started a bi-weekly dispensary with an attendance of 160 patients suffering from leprosy. Arrangements were made by the District Board for the carrying on of this dispensary when the survey party passed on to the next centre.

SUGGESTIONS.

(1) In all the thanas where the unskilled census shows an incidence of more than 200 lepers per 100,000 population well-trained workers should be sent to open S. P. T. (Survey, Propaganda, Treatment) centres. They should carry out the following activities which will occupy 4 to 8 weeks in each thana:—

(a) Train medical officers who will continue to carry on leprosy work when they leave.

(b) Carry out propaganda work by lantern lectures, distribution of literature and in other ways.

(c) Initiate dispensaries for the diagnosis and treatment of leprosy.

(d) Carry out a skilled leprosy survey in the villages.

Specially trained doctors should then be placed in charge of these dispensaries to carry them on permanently.

(2) The latter doctors should be employed by and supported by the District Boards. In addition to running a dispensary twice a week, each doctor should follow up patients to their villages, examine contacts and thus find out early cases and persuade them to come for treatment. He should also teach village communities how to isolate infectious cases in huts outside the villages where they can be attended to by their adult relatives.

(3) The doctors in charge of leprosy centres should be under the direct supervision of the district health officer who should himself be well trained in leprosy work and able to advise the doctors under his charge.

(4) Arrangements should be made for microscopic examination of slides at one or more centres in each district and also for the examination for the presence of syphilis which is a frequent complication. The Kahn test is the most suitable for this purpose and it can be carried out successfully in mofussil stations by suitably trained workers.

It may be mentioned that syphilis and tuberculosis may also be dealt with indirectly by such centres as the above: syphilis—as when syphilis is present along with leprosy the former disease must always be treated first: tuberculosis—as the sanitary, hygienic and other precautions which will be taught in connection with leprosy work are among the most beneficial in the prevention and treatment of tuberculosis. Fear of leprosy which is such a dreaded disease can in this way be used as a force in spreading the knowledge of general sanitary reform. The success of these leprosy dispensaries must of course depend on the knowledge, capacity and character of the doctors in charge. But sub-assistant surgeons, who are keen on their work and have had a suitable course of training, can make them work well. District health officers are busy for part of the year with various epidemics; but there are several months when ordinary epidemics are at a standstill and they are free to devote their time to such endemic diseases as leprosy.

I append a report prepared for me by Dr. Isaac Santra who was directly in charge of the survey made at Manbazar. It gives in more detail the method of running a Treatment-Propaganda-Survey centre.

REPORT ON LEPROSY SURVEY WORK AT MANBAZAR THANA, DISTRICT MANBHUM, BIHAR AND ORISSA.

By ISAAC SANTRA,

Assistant Research Worker in Leprosy under the Bihar and Orissa Government at Purulia.

Manbazar is situated in the north-east corner of the Manbhum district and is bounded by the Bankura district on its eastern side. The incidence of leprosy is high in the east part of Manbhum and the west part of Bankura. For practical purposes Manbazar thana would form the centre of the leprous area and therefore a common ground of investigation in both the districts.

In July 1926 through the courtesy of the Deputy Commissioner a list was obtained of all known lepers in the different thanas. This census was made through the chaukidars and in many cases contained the names of known persons, their castes and villages.

We commenced work from the 1st March 1927. Dr. Ghosh, the leprosy propaganda worker for Bengal, stayed at the spot. I visited the place once a week. We had three trained men from the Purulia Leper Asylum to help in the survey work. A map was made showing the number of lepers in different villages. The work first commenced at Manbazar. A survey always followed a magic lantern exhibition on the previous night. The police cases served as nuclei for the survey

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and we had to trace contacts and find out other cases. One has to do this very tactfully. With the educated and rich classes one has to use sympathy and persuasion. With the Bauris sometimes a little force. After searching out the Bauri lepers it is easy to find the sufferers among the higher castes, since most of the Bauris are employees in the quarters of the rich. The school children are examined as a rule. In many instances cases could be traced from the history given by school children.

After working for a week it was felt that we must treat patients who desired treatment. An out-house of the Manbazar dispensary was used for this purpose. By the end of the survey work, two months from the beginning, we had about 170 patients coming to the dispensary for treatment.

Dr. Muir, the Deputy Commissioner, Vice-Chairman of the District Board and the Health Officer visited this out-door clinic on the 23rd April. On the same evening a formal conference took place in the Vice-Chairman's house and it was decided that the District Board should have three out-patient clinics, one each at Manbazar, Raghunathpur and Ichagarh. A few days after this was passed as a resolution by the District Board and the work has already started at two places.

Distribution: The prevalence of leprosy is more in the north-east than in the south-west. The southern part is hilly and is inhabited by the Sonthals. Ten villages contained more than 10 lepers and twenty-four villages have 5 to 10 lepers in each.

Possible causes of high incidence: Water is scarce, vegetables unobtainable during summer and milk is the diet of only a few rich people. Syphilis is common. All these make the human body a rich soil for the growth of *lepra bacilli*; but, considering that leprosy is highly incident amongst different castes with definitely different ways of life, one is lead to think that there is another large factor which helps the spread of leprosy in one and checks it in another.

INCIDENCE OF LEPROSY AMONGST THE VARIOUS CASTES.

Castes.	*Population.*	*Number of lepers.*	*Number per mille.*
Bauris	7,935	107	13
Kurmi	19,349	137	7
Bhumij	10,332	50	4
Sonthals	22,994	63	2

Note:—The number of each caste is taken from the 1901 census as later figures are not available.

The Bauris have been associated with the higher castes from a very remote period. The word Bauri comes from a Sanskrit word barbara (barbarian). They serve the high castes but have not adopted their ways of living. They and their pigs live in small huts under crowded conditions. Rice is their main food, "hadia" (rice spirit) is their favourite drink, and carrion a much prized delicacy. The marriage tie is loose, divorce without law-suit is common, dishonouring the female is not resented, hence syphilis is common.

The Sonthals show a marked contrast to the Bauris. They prefer the hill side to the big village. They have clean houses, well separated from each other. The honour of woman is jealously guarded, child marriage is unknown and the standard of morality is high. If they ever practice sexual promiscuousness it is not extended to non-Sonthals. Syphilis is very rare. The Sonthal also eats carrion and drinks "hadia," but his manner of life isolates him from lepers.

The Bhumij and Kurmi stand half way between. The Kurmis are the real natives of the Manbhum district. They retain some of their old ways, but have adopted some of the Bengali ways of living. The Bhumij is similar to the Sonthal but has learnt to respect Brahmins, while the real Sonthal dislikes Brahmins and will not eat food cooked by them. They say that Sing Bonga, the Creator, when he created the first seven children, told them to stand in a line and run to a certain spot where there were all sorts of food. The Sonthal being the best runner arrived first and, seeing that beef was the most delicious, partook of it, while the Brahmin, being the weakest, arrived last and got nothing but vegetables. It is interesting to note how these two classes, living on the two extreme wings of dietary, have an almost equal incidence of leprosy (B. & O. Census Report). It leads one to think that if the Brahmin were to become a Sonthal in respect to leading an active life and inhabiting airy places, and the Sonthal were to become a Brahmin, in respect to using milk and vegetables, leprosy might disappear from both peoples.

What about the Bauris? They are the slum-dwellers of society and there can be no hope for them until society elevates them to human conditions.

The following are the figures extracted from the survey carried out in the Manbazar thana:—

Population of the thana	97,504	
Number of lepers	633	(6.49 per mille)
Number of villages surveyed	347	
Number of villages furnishing cases	188	

Classifying the cases according to the classification used at the Calcutta School of Tropical Medicine they were as follows:—

A1 (early nerve cases)	221
A2 (late, secondary nerve cases)	136
B1 (early skin cases)	80
B2 (more advanced skin cases)	81
B3 (most advanced skin cases with nodules and thickened lesions)	78
Refusing examination	37
	633

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The chaukidars naturally failed to detect the earlier (A1 and B1) cases, but their total figures (237) are not far short of our B2, B3 and A2 cases which, added together, come to 295.

Preventive measures:

(1) Propaganda regarding the spread of the disease.

We found that lepers are employed as cow-herds, as they are unfit for other work, so they have to go from house to house and may spread the disease in this way. We saw a few children left in the care of an old woman, a highly infectious leper, the parents having gone to the fields to work. Nothing but propaganda can stop such a state of things.

(2) An attempt to introduce milk and vegetables into the diet of the people. Sometimes it is argued that the people have no money to buy better food or to live in better houses. Apart from the money spent on religious ceremonies, if half the amount spent on drink and dancing girls could be reserved for food and housing, it would be easy to raise the standard of living and ameliorate the conditions which at present make for the prevalence of leprosy.

(3) Confidential registration of lepers treated at public dispensaries, and periodical examination of children of lepers registered.

(4) Periodical examination of school children at the request of the school authorities and of servants when requested by employers.

(5) Out-door clinics should be begun at suitable centres. All cases registered at these clinics except the A2 cases should be kept under treatment and the pressure of public opinion should be brought to bear on absentees. Two to four days in the week should be set apart for injections, the remaining days being spent in propaganda work.

HUMAN PLACENTA AS AN ENRICHING MEDIUM FOR THE GONOCOCCUS.

By J. H. THEODORE, I.M.D.,
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As an enriching agent in media for the growth of gonococci, brain emulsion and testicular extracts have of late been tried with practically no success.

Recently, a serum agar prepared from human placental broth, has given very good results. The medium is prepared as follows:—

Human placental broth is prepared by passing a placenta through a mincing machine. To 1 lb. of minced placenta is added 1,000 c.c. tap water. Boil for 15 minutes, allow to settle, filter, and add 10 gms. peptone and 5 gms. sod. chloride. Test the pH, which is usually about 6·8. (It is not necessary to standardise the broth at this stage). Add 40 gms. of agar fibre, autoclave for half-an-hour at 15 lbs. pressure, cool, and clarify with white of egg (3 eggs). Filter and distribute into flasks in quantities of 80 c.c. Autoclave for half-an-hour at 15 lbs. pressure. The flasks containing 80 c.c. are kept as stock. For use, melt the flask as required and at 40°C. add 20 c.c. of ascitic or hydrocele fluid. The pH of the media at this stage approximates 7·8. Pour into tubes and slope.

Ordinarily nutrient agar with the addition of hydrocele fluid gives better results than nutrient agar with ascitic fluid, possibly on account of the richer albumen content of the former; but with the human placental broth agar the addition of ascitic fluid is sufficient to produce a luxuriant growth. Ascitic fluid is more easily obtained. We find a distinct advantage in that we are able to turn out and stock a much larger quantity of gonococcus vaccine.

Growths obtained from this medium have been so luxuriant that in the preparation of stock vaccine we find that we are able to deal with half the number of slopes hitherto used to produce a defined capacity.

Human placenta can usually be obtained in most localities and at present this valuable source of material is wasted: very probably it might greatly help cultivation of other delicate organisms and of tissue culture.

SPECIAL ARTICLE.

THE AUTO-STERILIZING MECHANISM OF THE GASTRO-INTESTINAL TRACT. (A NOTE ON THE USE OF DILUTE ACIDS IN THE PREVENTION AND TREATMENT OF CHOLERA).

By LLOYD ARNOLD, B.A., M.A., M.D.,
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THE acidity of the stomach has been known to cause inhibition and even disinfection of the bacteria introduced into the lumen of this organ.

Schultz (1901) introduced *Vibrio Metschnikoff* directly into the duodenum of dogs and found that these bacteria were destroyed before reaching the ileum. Rolly and Liebermeister (1905) confirmed this observation, and several investigators since this time have repeated and substantiated these results.

There must be at least two factors that contribute toward the control of the endogenous obligatory bacterial flora of the intestinal tract, namely, the hydrogen-ion concentration of the gastric contents, and the bactericidal power of the upper part of the small intestine. We have been interested for some time in this "auto-sterilizing" mechanism of the gastro-intestinal tract (1926, 1927). The upper half of the small intestine of man and of various experimental animals has been found to be slightly acid in reaction. There is a predominance of hydrogen over hydroxyl-ions, the H-ion concentration varies from about pH 5·5 to 6·5.

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The acid secreted by the stomach first neutralizes any alkaline-reacting material in its lumen, then all the buffer substances are saturated with acid radicals, there is usually an excess of acid beyond this range, namely, the free acid. We do not wish at this time to enter into a discussion of the gastric secretory mechanism. We are of the opinion that its purpose is to acidify the contents of the ingested material in its lumen. Protein and such foods as cause the maximum acid secretion, are substances of such chemical composition that they can take up a large amount of acid by their buffer action. When the gastric contents enter the duodenum, the free acid is quickly neutralized by the alkaline enteric, hepatic and pancreatic secretions. The bound or combined acid is slowly liberated. This explains the slight predominance of hydrogen-ions in the upper part of this tract. We have found the contents of the lumen of the small intestine to be almost bacteria-free in this zone of acid reaction; there are a few Gram-positive cocci of the *Streptococcus fæcalis* or *enterococcus* types present here, when a relatively large amount of material is used to seed the nutrient medium. The lower part of the jejunum and all of the ileum is neutral or alkaline in reaction. In this region we encounter the mixed or fæcal type of bacterial flora. The Gram-negative bacilli of the *B. coli* family are seldom found in that part of the intestinal tract that is acid in reaction.

We have developed a technic that allows us to fix any segment of the small intestine to the anterior abdominal wall in the experimental animal in such a way that we can enter the lumen of the intestinal tract with a needle through the anterior abdominal wall and aspirate material for chemical and bacteriological study. Injections of various substances can also be carried out with these preparations. We have had dogs with one or more segments of the small intestine fixed to the anterior abdominal wall in our laboratory for several months, and these animals are perfectly normal in every way.

Table I shows the hydrogen-ion concentration and the bacterial flora (ærobic agar cultural methods) of several levels of the intestinal tract of the normal dog.

TABLE I.

Bacterial flora and hydrogen-ion concentration of the small intestine (post-digestive) of healthy dogs.

Portion of Small Intestine.	Bacterial Flora.	H-ion Concentration
Duodenum ..	few Gram positive cocci	pH 2.5 to 6.0
Jejunum, upper half ..	few Gram positive cocci	pH 5.5 to 6.5
Jejunum, lower half ..	Gram positive cocci, few Gram positive and Gram negative bac.	pH 6.0 to 7.0
Ileum ..	Very rich bacterial flora	pH 6.8 to 8.0

Table II shows the differences in the reaction and bacterial content of the dog's intestinal tract when the animal's temperature is elevated by foreign-protein injection or when he is confined in a hot humid room. The same results can be obtained when large doses of alkaline salts are frequently administered by mouth.

TABLE II.

Bacterial flora and H-ion concentration of the small intestine of a fever dog.

Portion of Intestine.	Bacterial Flora.	H-ion. Concentration.
Duodenum ..	heavy growth mixed flora	pH 6.9
Upper Jejunum ..	heavy growth mixed flora	pH 7.2
Lower Jejunum ..	heavy growth mixed flora	pH 7.4
Ileum ..	heavy growth mixed flora	pH 7.5

Table III shows the changes in the bacterial flora of the duodenum when alkaline buffered solutions are injected directly into the lumen through the anterior abdominal wall according to the method we have previously mentioned. The peripheral distribution of leucocytes during this experiment is also given. Dog 6 was a normal animal, Dog 7 had a stitch abscess (*Staphylococcus albus*) and showed fever and a peripheral leucocytosis as well as a fæcal type of bacterial flora in the duodenum.

We wish to refer the reader to the original publications for further details of these experiments. When the normal reaction of the contents of the duodenum and upper jejunum is changed from a slightly acid to a neutral or alkaline reaction, there is a change in the bacterial flora of this region to that type usually found in the ileum and cæcum. Tying off the pancreatic ducts does not change the duodenal flora of the dog. We concluded that the maintenance of the normal H-ion concentration of the contents of the duodenum and upper jejunum is dependent to a great extent on the normal gastric secretory function.

In another series of experiments we established a fistula through the appendix in the dog and gave chromogenic bacteria by mouth, suspended in various substances.

Our conclusions from these experiments were as follows:—

Bacteria introduced into an empty stomach of a dog, 12 to 18 hours after a meal, do not reach the cæcum. Bacteria introduced with alkaline buffered milk reach the cæcum in large numbers over a relatively long period of time; when fed suspended in acid buffered milk they sometimes reach the cæcum, but only a few bacteria do so and these soon disappear. The bacteria suspended in acid buffered aqueous solutions, given to a dog by mouth, seldom reach the cæcum; but when given in alkaline buffered

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TABLE III.

Changes in the bacterial flora of the duodenum and the peripheral leucocytes after alkalinization of the duodenum.

Bacterial Flora.	Time.	Temp.	W. B. C.	Differential Count.					Arneth's Index.
				Polys.	Lymph.	Mono.	Trans.	Eosino.	
DOG VI	9-50 A.M.	101·2	9,200	..	..	..	..	..	..
Before injection ..	10-30 ,,	101·2	18,600	85	12	1	1	1	36·0
4 calories enterococci ..	11-00 ,,	101·4	18,800	87	9	2	2	..	26·0
After experiment ..	11-30 A.M.	101·0	19,000	94	3	1	2	..	34·5
150—200 calories mixed flora	12-00 ,,	100·8	21,200	87	12	..	1	..	52·5
DOG VII	8-20 A.M.	103·4	35,500	90	7	..	1	..	45
Before injection ..	9-00 ,,	102·4	29,600	87	9	1	1	..	42
150—200 calories mixed flora.	9-30 ,,	102·8	43,200	91	8	..	..	..	48
After experiment ..	10-00 A.M.	102·6	36,200	88	9	1	2	..	53·5
200—250 calories mixed flora.	10-30 ,,	102·8	41,300	92	5	3	1	..	33·5

50 c.c. of a phosphate buffered solution pH. 8·9 (37° C.) injected into duodenum.
Dog VI injected at 10 A.M. Dog VII at 8-30 A.M.

aqueous solutions, the bacteria reach the cæcum in almost the same concentration as the original ingested suspension. We concluded that the "auto-disinfecting" mechanism of the upper part of the small intestine is dependent upon the presence of acid buffered material in its contents. This reaction is insured in the healthy animal by normal gastric secretory function. When neutral or alkaline buffered material enters the duodenum, this bactericidal power is lost and the bacterial content of such material is passed on through the whole length of the small intestine.

The elevation of the internal temperature of man or experimental animals, causes, among many other things, a depression of hydrochloric acid secretion of the stomach. Sudden changes from external environments that are associated with considerable differences in temperature and relative humidity must exercise an influence upon the heat regulatory mechanism of the body, and accompanying this, a diminution in the power of the gastric mucous membrane to concentrate hydrogen-ions in sufficient amounts to buffer all food material ingested. Any other influence that might cause a hypo-acidity of the gastric juice would add to this reaction. Focal infections, malnutrition, physical exhaustion, mental excitement and mental strain, and all such influences that are known to cause a diminution in the hydrochloric acid secretion of the stomach would be predisposing factors to a still greater degree of suppression of gastric acidity under the conditions of adverse external environment. We conceive of the latter to be a temperature that will make it difficult for the organism to maintain its own heat at the normal constant level. High dry bulb with low wet bulb readings are of course exhausting, but not to the same extent (provided aqueous metabolism can be maintained by fluid ingestion) as when both the dry and wet bulb thermometers register high temperatures at the same time. This makes it exceedingly difficult for the individual to give off enough heat by skin evaporation to keep the internal temperature from elevation to the point of interfering with gastric function. [American literature, Yagloglou (1924); British, Hill (1919, 1920), Carlette (1921); German, Semuth (1926); can be consulted for details of modern conceptions of heat-regulatory mechanisms of the human body.]

When one applies this conception of the mechanism of control of the bacterial flora of the gastro-intestinal tract to the problem now being studied by Lieut.-Col. A. J. H. Russell, I.M.S. (1925), namely, the effects of meteorological conditions upon the incidence of cholera in India, certain new factors become apparent. The writer is not familiar enough with conditions in India to discuss this matter. The close correlations that exist between temperature and relative

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humidity and the death-rates from cholera are very striking.

The physiological condition of the population may help to explain the lag of two months in the fertile districts between the high temperature, humidity, etc., and the cholera epidemic. Where there is a malnourished population and a sudden change from a high dry bulb and low wet bulb reading to a condition where both dry and wet bulbs show a high reading, the endemic cholera becomes epidemic, due possibly to a change in the host, namely, the loss of the normal gastro-intestinal bactericidal mechanism. Russell's cholera epidemics in the southern provinces show in some respects a similar lag period to that encountered in infant diarrhœal death-rates due to temperature and humidity elevation in New York City (Arnold 1927). If one reads Roberts' (1906) accounts of enteric fever in India with our conception of the changes in the susceptibility and resistance of the host to these infections, one can sympathize with the difficulties Roberts encountered in trying to make the drinking water play the primary rôle in the spread of this disease among the European recruits in the Army in India. Probably the most complete epidemiological study of typhoid in America was carried out under Dr. M. J. Rosenau's (1907) supervision by the United States Department of Public Health at Washington, D. C. After their careful and extensive study, the main points might be summed up by quoting a paragraph from their report:—

"The presence of typhoid bacilli in great dilution and perhaps attenuation may not have the power of directly causing the disease in persons drinking such water. Water, however, containing an occasional typhoid bacillus may infect a community in such a way that large numbers of persons become carriers. With the advent of the hot weather, many such persons may be stricken with typhoid fever. In other words, the presence of the typhoid bacillus in the intestinal tract has not always the power of causing typhoid fever. We must reckon with our host. The dilute and attenuated infection in the water may sow the seed; for the production of the disease we must have susceptibility, and this susceptibility may be largely brought about by the diminished resistance caused by the summer heat."

Dr. J. W. Tomb's (1923) article in regard to the use of dilute acids as preventive and curative for cholera has stimulated the author to write this brief review of his work. The observations reported by Dr. Tomb are certainly encouraging. The reduction in the incidence of cholera is very striking. The average of 1,200 cases of cholera per annum in his district with 600 deaths was considerably reduced by the oral administration of sulphuric acid in essential oil with a little alcohol. When contacts were given this mixture twice or three times daily for two days cholera did not develop, whereas without it there were 50 per cent. of the original number of cases usually who developed cholera by contact. The use of this mixture in larger amounts and administered frequently shows a remarkable curative effect in cholera. The use of acids for the prevention and treatment of enterica, cholera and such diarrhœal conditions seems to have been a widespread practice in the Orient.

It is probably unnecessary to discuss this matter any further at this time. We wish to re-state briefly our conception of the normal "auto-sterilizing" or disinfecting mechanism of the gastro-intestinal tract and how dilute acids are theoretically the ideal substances to administer to the host to increase his resistance to a gastro-intestinal infection.

When the contents of the upper part of the small intestine are slightly acid in reaction, there is something produced by the healthy intact mucous membrane that causes a destruction of the bacteria. We think this is a bacteriostatic substance; after devitalization or inhibition of the power of reproduction, these bacteria are destroyed by the normal digestive processes. This explains the disturbing observations of finding many stainable bacteria in this region, but few if any viable micro-organisms. The function of the gastric mucous membrane is to cause an acidification of the material in contact with it. The greater the acid demands of this physiological food, the more hydrogen-ions are secreted, and there is usually an excess above this demand. This is the inhibiting mechanism to further acidification, whilst duodenal regurgitation is another protective factor against too great a concentration of hydrogen-ions in the gastric contents. Complete saturation with acid, chemical and physical, is the most important gastric function in the mammals. The free acid is quickly neutralized in the duodenum, the bound acid is slowly released and in fact does not fully disappear until the middle of the jejunum is reached. This acid-reacting part of the intestinal tract plays the greatest rôle in digestion and absorption. Calcium and such acid soluble salts could hardly be absorbed as an insoluble alkaline salt. Any condition that will cause a sudden suppression of gastric acidity will interfere with the normal protective bactericidal power of the intestinal tract and allow ingested bacteria to grow in its lumen. This usually produces a diarrhœa; if there are pathogenic bacteria present in this exogenous flora, they grow and invade or destroy the mucous membrane in the non-immune individual. Part of the mechanism of recovery may be a restitution of this bactericidal mechanism; in this case, acids could be of benefit in treatment. The author is interested in prevention and not treatment and wishes to emphasize only the preventive aspects of this question. The ingestion of food already acidified will probably be found even more efficient than the ingestion of aqueous acidified fluids.

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whilst both should exercise a still greater protection than either alone.

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A Mirror of Hospital Practice.

A CASE OF SUBLINGUAL ABSCESS.

By MAGANLAL D. LATHIGARA, M.B., B.S.,

Bilkha Dispensary, Kathiawar.

A HINDU lady, aged 30 years, came to this dispensary for treatment of pain in the throat and difficulty in swallowing of about one month's duration. She was admitted as an in-patient on the 6th January, 1927. I examined the throat and could find nothing abnormal except an ordinary pharyngitis. She repeatedly asked me to see whether any foreign body, such as a bristle from a toothbrush, could have lodged in the throat, as she had considerable pain whenever she tried to swallow anything. Her other symptoms were pain in the chest and neuralgic pains in different parts of the body. On careful examination of the patient, I concluded that the whole condition was hysterical, and ordered a tannic acid paint to the throat and a potassium chlorate gargle. Two days later she ceased to visit the dispensary.

On the 10th January, I was called in to see her at her home, and to my surprise I found her acutely ill. The submaxillary region was swollen, red, and tender. The swelling extended from the lower border of the mandible to the thyroid prominence, and laterally as far as the inner border of the sterno-mastoid muscles. The entire tongue was swollen and of a stone-like hardness, and painful. The tip of the tongue protruded from the mouth, which could not be closed. There was a profuse flow of saliva of a foul odour from the mouth. The patient could neither speak nor breathe properly. She was having rigors and the temperature was 103°F.

The abdominal and other systems were normal, and I could come to no diagnosis. Symptomatic treatment was accordingly adopted; an ichthyol and belladonna application over the swollen parts, hot magnesium sulphate compresses, and potassium permanganate gargles. As she was unable to swallow food and refused enemas, I had to watch her condition continuously. The measures adopted gave her some relief, and when I saw her next morning, she was better, but there was a copious flow of pus, saliva, and blood from the mouth.

On carefully looking for the source of the pus, I found it welling out from the duct of the right sublingual gland, and on pressing from below I was satisfied that the whole mischief was the result of an acute abscess of the sublingual gland. The swelling of the tongue was still present, but the patient could take milk and a fluid diet.

Gargles and fomentations were continued and I again saw the patient on the third day. She could now speak and sleep well. In ten days time all symptoms had disappeared, and when I saw her a month later she was in good health.

I carefully examined her for pyorrhœa or caries, but both conditions were absent. No other constitutional disease was detected.

Cases of acute abscess of the sublingual gland must be rare, and in the present instance there appears to be no cause to account for the condition. The enormous swelling of the tongue has also to be explained. Cases of acute glossitis are not uncommon, but are usually traceable to some definite cause, which was entirely wanting in this case. I have again examined the patient before writing this note; she is now in excellent health and has practically forgotten the illness.

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A COMPLICATION OF OPERATION FOR VESICAL CALCULUS.

By HUKAM CHAND GUPTA, B.SC., M.B., B.S.,

Assistant Surgeon, Egerton Hospital, Peshawar, North-West Frontier Province.

A CHILD, aged 4 years, was admitted to the Egerton Hospital, Peshawar, at 10 a.m. on the 23rd March 1927, suffering from retention of urine of 24 hours' duration. There was a history of painful micturition of one month's duration. On examination the bladder was found to be distended and its upper border reached to the umbilicus.

The child was anæsthetised with chloroform. On sounding a stone was felt, impacted at the internal urethral meatus, and was easily pushed into the bladder. A No. 6 catheter was passed, and the urine which was drawn off was found to contain pus. The bladder was thoroughly irrigated with hot normal saline until the returned fluid was quite clear. The stone was then crushed and was found to be quite soft and its debris was evacuated. Nothing untoward happened during the operation which took about 20 minutes and was quite bloodless.

At 4 p.m. the same afternoon the child was quite comfortable, with a temperature of 99°F, and had passed urine once since operation.

On the following morning, the 24th March 1927, the child complained of sudden pain in the calf of the right leg, which was tender to the touch, but no swelling was noticed. Hot compresses were applied every four hours. The child had vomiting, however, and had a normal stool and passed urine. At 7 p.m. he still complained of pain in the leg. The second toe of the right foot appeared to be blue and rather cold. A hot phenyl bath was ordered every four hours. The patient was restless and the breathing rather rapid, but nothing else abnormal was detected. The lungs and heart appeared to be sound and the temperature was subnormal, and had remained so the whole day.

On the 25th the whole of the right foot up to the ankle joint appeared bluish in colour and was very cold: a line of demarcation also appeared about the ankle. The temperature was 100°F, and the child was in a toxæmic state. An alkaline diuretic mixture had been given throughout since the day of operation.

On March the 26th the child's condition was worse, with a temperature of 102°F, and he was practically in a moribund state. The parents unfortunately insisted on removing him from hospital, and thus no further observations could be made on the case, but on enquiry, I was informed that he died the same evening at 10 p.m.

The child had cystitis of some standing, following on chronic irritation due to the stone in the bladder, and acute retention causing over-distension of the bladder, due to impaction of the stone at the internal urethral orifice. There was presumably simultaneous venous engorgement of the vesical plexus. Possibly some laceration was caused at the neck of the bladder when the stone was pushed inside it, with the subsequent entry of germs into the vesical veins; such microbes being carried to the right side of the heart, thence through the arterial circulation to get caught in the posterior tibial artery, with thrombus formation, occlusion of the circulation, and gangrene.

I should be grateful if any of the readers of this journal could throw any further light on such an obscure case. Further, the case causes one to hesitate with regard to the line of procedure in such cases. Is it better to operate immediately, or to be content with catheterisation and irrigation of the bladder for a few days, until the condition quietens down, and then crush the stone?

THE TREATMENT OF FILARIAL FEVER BY NEOSALVARSAN.

By CHIMANLAL M. DALAL, M.B., B.S.,

Haripura Road, Surat.

THE article on the necessity for a Commission of enquiry into the filariasis problem by Sir Frank Connor in the *Indian Medical Gazette* for May, 1927, has been of great interest to me, since the disease is so common on this side of India, and any efficient method of treatment is most eagerly sought for. The following are notes on three patients whom I have treated with neosalvarsan, with encouraging results.

Case 1.—M.L.L., male Hindu, aged 29 years, used to get attacks of filarial fever with rigors, vomiting, and painful swelling of the inguinal glands on both sides, almost every month for two years. In spite of treatment the attacks became more frequent, and when he consulted me he was getting the attacks every 8 to 10 days. I gave him an injection of 0·6 gm. of neosalvarsan. Since then he has been completely free from the attacks: I have had him under observation for more than two years now, and during the whole of this period he has had no further attack of filarial fever. The glands are much reduced in size.

Case 2.—K. N. K., male Hindu, aged 28 years, was suffering from attacks of filarial fever with swelling of the right forearm and hand, and enlargement of the right epitrochlear gland. He was treated with domestic remedies for about a year and then with injections of antimony, without any improvement. After a single injection of 0·6 gm. of neosalvarsan he became free from fever and the other symptoms. A second similar injection was given a few days later. I have now had him under observation

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for two years; the swelling still persists, but is much reduced as compared with its former state.

Case 3.—J. I. P., Hindu female, aged 21 years, had her left leg and foot swollen. The swelling had come on gradually and had increased to a considerable degree in the course of about three years, but without attacks of fever. About ten months before I saw her, she commenced to get regular attacks of fever every month, with rigors, vomiting, and increased swelling and pain and redness of the affected parts. The inguinal glands on the same side became enlarged and painful during the attacks. Four such attacks occurred, each accompanied by marked increase in the swelling of the leg and foot, before I saw her. I gave one injection of 0·6 gm. of neosalvarsan only; and since then—a period of six months—she has been entirely free from fever, whilst the swelling of the leg and foot has been definitely reduced.

Have any of the readers of the *Indian Medical Gazette* tried neosalvarsan in such cases, and if so, with what results? Also what are the best measures to take for the swelling which persists after the fever has disappeared?

GUINEA-WORM INFECTION; A PERSONAL EXPERIENCE.

By PRAMODRAI MOTILAL BHACHECH,

Rajputana Medical Service, Raipur Jatini, Ahmedabad P. O.

As guinea-worm infection of the upper extremities, and especially of the eye, is rare, the following notes on my own personal case history may be of interest to the medical profession in this country. As is well known, the disease is contracted by drinking or bathing in water containing infected Cyclops, and where the same source of drinking and bathing water is used by several members of a family, some or all of them may become infected.

I first suffered from guinea-worm infection in 1908, when two worms appeared in the right lower extremity, one in the lower part of the right buttock and one in the middle of the right thigh. Both came out in pieces and caused suppuration. Later, in 1912, when in charge of the Shree Raghunath Dispensary in Pratabgarh State, Malwa, I was again attacked with the disease in the middle of the dorsum of my left foot. The worm was palpable under the skin from the left knee to the ankle, and the whole of the leg was swollen and subsequently suppurated. After an illness of about three months the worm was slowly discharged, its exit being hastened by pouring hot water over the part. With the help of my compounder, who kept pouring hot water over the part, I finally extracted the worm after some three-quarters of an hour's effort. The worm was entire, about 2½ feet in length, with head and tail. It was afterwards burnt in grass.

As I had no one to relieve me, I had to carry on the work of the dispensary as best I could, giving instructions to the compounder from my bed as to how to treat different cases.

Recently, fifteen years later, I have had a recurrence of the infection, when a worm appeared at the inner canthus of my left eye. This time the worm was a small one, only about three inches in length, and its appearance was not heralded by previous urticaria or fever, as in the two previous instances. The condition started as a simple conjunctivitis with pain, which increased until—for 48 hours—it was so severe that it was almost impossible to bear. The left cheek was swollen, and, not knowing what the condition was due to, and having a loose carious first upper molar tooth on that side, I had the tooth extracted by Dr. Romer of the Civil Hospital, Ahmedabad. I had no suspicion that the symptoms might be due to guinea-worm infection, until one day I noticed the worm beginning to extrude itself from near the supra-orbital foramen. I then kept the part treated with cold boracic compresses and the worm was delivered easily and without pain. The pain in the eye subsided the same day, and I got my first sound night's sleep for several days. There is still, as I write, some haziness of vision and a little painfulness on reading, but the symptoms are quickly subsiding.

During the last three years I was first at Dungarpur, a station in the hilly area in South Rajputana: then was on sick leave for chronic tachycardia, and for the last year have been at my home near Ahmedabad. I left Dungarpur in June, 1926, and the worm appeared in the eye in March, 1927.

A CASE OF TOXIC HEART-BLOCK DUE TO *CERBERA THEVETIA*, (YELLOW OLEANDER SEEDS).

By BHUPENDRA MOHAN ROY, L.M.F.,

P. O. Chackasi, Howrah District.

HARIA DHOBA, Hindu male, aged 22, a young Ooriah coolie, working in a jute mill, was brought to me for treatment for poisoning from seeds of *kanir* (yellow oleander) on the 17th April, 1927.

Condition of the patient.—On examination, the patient was in a semi-stuporose state and could not raise or hold up his head. The arms and legs were flaccid, and saliva and ropy mucus were flowing from the angles of his mouth. At intervals he tossed his head from side to side and threw up his arms and legs. He could not answer questions.

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Circulatory system.—Pulse, feeble and slow, irregularity very marked, rate 36 per minute.

Respiration shallow and hurried.

Pupils normal and reacting to light.

Blood pressure 120|76.

The patient was in a depressed, almost moribund state. He was given a few whiffs of ammonia, and then opened his eyes, and made the statement that, in order to end his miserable existence, he had collected 14 seeds of the *kanir* plant from the river side, and had taken 8 of these, squashed up with one pice worth of vermillion at 9 a.m. At 12 noon, his room mates came home and attempted to rouse him, but failed. They gave him a good shaking, but he only vomited and muttered that he had taken *siddhi*. On this they became suspicious and brought him to hospital.

Treatment Adopted.

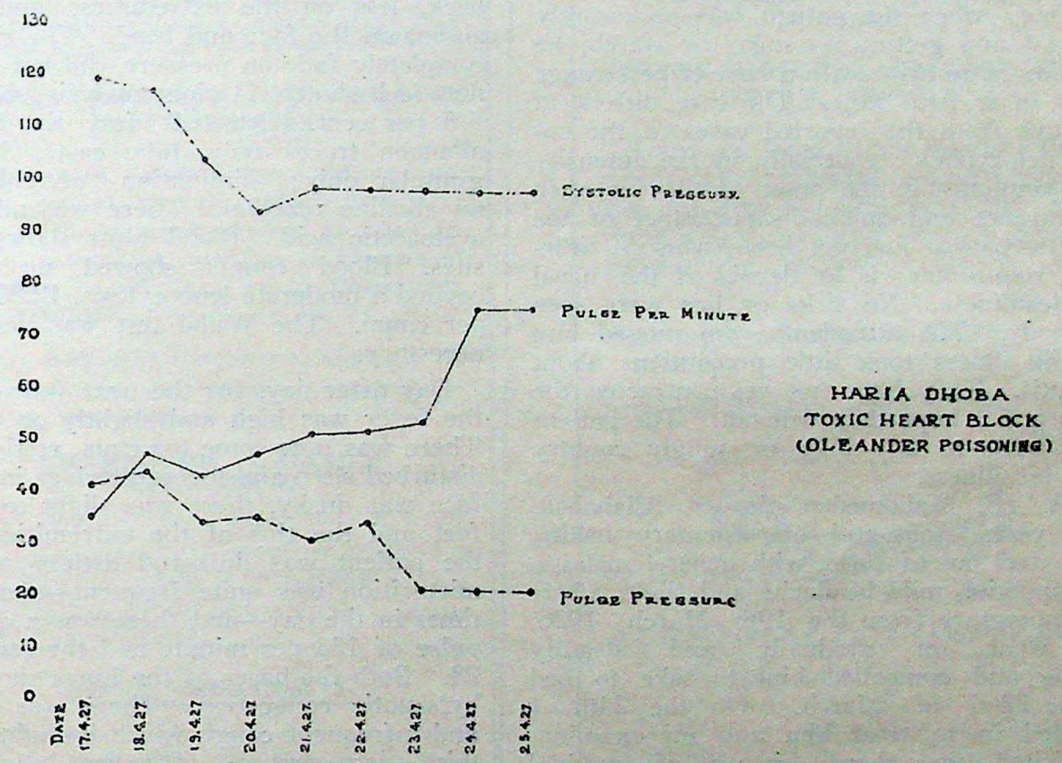
17th April, 1927. The stomach was immediately washed out, and its contents saved for examination by the Chemical Examiner. Washing was continued until clean water only was returned. Atropine, gr. 1|100th was given hypodermically every four hours, and a dose of magnesium sulphate to clear the bowels. The patient slept well during the night in a semi-stuporose state.

18th April, 1927. The patient was spitting bilious fluid. Feels hungry. Atropine gr. 1|100th continued every four hours. Barley and sugar diet. Later on he complained of a burning sensation in the body and was cold sponged. In the evening he talked like a normal person.

19th to 25th April, 1927. Nothing untoward happened and the progress of the case was favourable. Atropine, gr. 1|100th, was continued every four hours until dilated pupils, a dry skin, and great thirst were noticed. The pulse and blood pressure were carefully recorded. A chart showing the blood pressure and pulse rate and pressure is sent herewith.

On the evening of April the 25th, the patient was handed over to the police, to take his trial in the law courts.

Interesting points in the case are:—



(1) Was the recovery of the patient due to the prompt washing out of the stomach? He had taken a heavy dose (8 kernels) of oleander seeds, whereas 2 kernels have previously been recorded as fatal in the literature.

(2) The heart-block, probably toxic in origin, was promptly relieved by adequate doses of atropine, given to produce a mild physiological effect.

My thanks are due to Dr. K. L. Basu Mallik, M.B., for allowing me to publish the records of this case.

REFERENCE.

Lyon. *Medical Jurisprudence for India.*

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A CASE OF TYPHUS FEVER IN ALLAHABAD.*

By R. N. BANERJI, B.SC., M.B., B.S. (Allahabad).

I TAKE the liberty of reporting the following case of typhus fever for more reasons than one. Typhus is very rare here and at the time this case occurred careful investigation revealed no other cases in the town. About the time this case occurred the climate of Allahabad was certainly not "hot" as it is in other years, but it was cooler. The onset being very gradual and like that of the enterica group, the early diagnosis of the fever presented some difficulty till the rash appeared. Then the quick appearance of the rash and its complete disappearance within so short a time is unusual. I do not know what effect diabetes has on typhus fever, but the fact remains that during the height of the fever when the patient was on entirely liquid food and getting no sugar or starch, he was passing more urine with a heavier percentage of sugar in it than now. The case differs in many ways from the reported cases of the so-called "tick-typhus," especially in the intensity of the symptoms, in the onset of the fever, in the appearance and quick disappearance of the rash. The patient had not been living in over-crowded rooms nor is he devoid of the usual bodily cleanliness. No ticks or lice were seen on his body. The attendants who nursed him during the illness took little precautions about prophylaxis. They have not yet contracted the infection and I hope they will not. The patient had not been to any hilly or jungly country prior to his illness.

Mr. A. H., Mahomedan pleader, Allahabad, aged 42 years, stout and of sedentary habits, began to feel out of sorts, with general malaise, loss of appetite, mild headache and slight afternoon temperature from the 19th March, 1926, which went on gradually and steadily increasing and compelled him to take to bed from the 22nd of March. On the 24th, I was called in to treat him and my examination elicited the above history of gradual onset with the absence of rigor or marked pains anywhere. I found the tongue slightly coated, appetite lost, great thirst, bowels constipated, urine high coloured and scanty but fairly frequent, conjunctivæ moderately injected, face flushed and temperature ranging between 100 and 101·6°F., and pulse between 94 and 110. The heart, liver and spleen were normal, pulse good in rhythm, tension and volume, and there was no tenderness or distension of the abdomen. Three days later, during which time the fever kept on gradually and steadily increasing with afternoon exacerbations reaching 104°F. like the "staircase" rise in the first week of enteric, the conjunctivæ were markedly suffused, the mental faculties were blunted, there was insomnia, and the patient was somewhat restless. The pulse was good with a systolic pressure of 133 mm. Hg and a diastolic of 87 mm. On the sixth day of illness, a few purplish circular spots were noticed on the sides of the chest and abdomen. After 24 hours, there was a generalised rash of light copper-coloured discrete papules of varying sizes from 1|20th to 1|4 inch in diameter. This rash was quite profuse on the chest and back, less on the extremities, and altogether absent on the face and head. The spots did not completely fade on pressure, did not itch and did not feel shotty. Urine analysis showed sugar 6·5 per cent. (detected for the first time), albumen traces only, tube casts, hyaline and granular only; diminution of chlorides and an alkaline reaction. There was no acetone or acetoacetic acid. Blood films showed no parasites. Blood counts showed no abnormality beyond a moderate leucocytosis, 12,800 leucocytes per c.mm. The Widal test was not considered necessary.

Day after day, for the next four or five days the fever was high and slightly on the increase. There was now some toxæmia, restlessness, very disturbed sleep and low mutterings in sleep. The face was dusky, there was slight œdema of the feet and the tips of the extremities were cold, the patient was dull and listless and drowsy, micturition was quite frequent—about 12 to 14 times in the day—and there was a quick dicrotic pulse of 133 per minute and the respiration was 28. Both the bases of the lungs showed marked hypostatic congestion. There was also a mild and infrequent cough which brought out scanty, thin, rusty sputum. The first heart sound was feeble.

The decline of the illness was more rapid than its onset, and the first symptom to vanish was the rash which completely disappeared by the 7th of April, i.e., within 4 days from its commencing to fade. The temperature fell by rapid lysis. With the fall of temperature the other signs and symptoms also abated and the patient entered convalescence on the 8th of April, after an illness of nearly three weeks.

The frequency of micturition and the total quantity of urine has also decreased but the glycosuria continues, sugar being 5 per cent. now and albumin nil and no tube casts. The treatment was on general lines as in enteric fever. The diagnosis of typhus fever was confirmed by Lt.-Col. R. Baird, I.M.S., to whom my thanks are due for his interest and advice in the case.

* On p. 264 of our issue for May, 1927, we published an account of two cases of typhus fever. The manuscript of this article was handed by the Editor to the Assistant Editor of this journal together with a letter from Dr. R. N. Bannerji of Allahabad; the manuscript itself had no author's name attached, and we unfortunately took Dr. Bannerji to be the author. Dr. Bannerji's case is the one here reported, and not the two in our May issue. The Editor is at present on leave in England, and it is clear that some mistake has occurred. In the meantime, we would be glad if the—at present—anonymous author of the article in our issue for last May would very kindly inform us of his name.—ASST. EDITOR, *I. M. G.*

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Special to "Times of India."

PARIS, (By Mail).

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The bottles, labels, printing and wrappings were all exactly imitated. Large shipments were made to Cuba and Mexico by deluded purchasers of the counterfeit medicines. Several arrests have been made but the police do not yet believe that they have caught all the men involved in the fraud which has cost reputable houses many thousands of pounds.

One of the cheated chemists with the connivance of the police set up a temporary export bureau and gave an order to the suspected persons. They duly delivered the falsified goods only to find themselves on arrival in the hands of the police.—British United Press.

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(2) Ease of administration—Small quantity injected (maximum dose 1·5 c.c.) either *intramuscularly* or *subcutaneously*. No disadvantages of disagreeable oily suspensions of Bi & Hg.

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Indian Medical Gazette.

AUGUST.

TROPICAL DERMATOLOGY.

WITH the issue of the current number of this journal we commence publication of a series of papers by Lieut.-Col. H. W. Acton, I.M.S., Professor of Pathology and Bacteriology, Calcutta School of Tropical Medicine and Hygiene, and Dr. MacGuire, his assistant in the Skin Out-patient Clinic of the School, on the common and important skin diseases of the tropics. And the time seems opportune to review some of the aspects of tropical dermatology.

Skin diseases are a subject commonly neglected by the medical student, both in Great Britain and in India. Largely this is due to the very perfunctory teaching of the subject. Also the ignorance with regard to such diseases, even of some of those who teach them, is profound. Yet in the tropics it is safe to say that cases of skin disease constitute quite 20 per cent.—possibly an even higher figure—of those who come for treatment, whilst the number of patients in India who seek for a placebo for some skin disease in chemists' shops must be legion. Ringworm of the body, leprosy, yaws, seborrhœic dermatitis are some of the commonest skin affections of the tropics, and one might continue the tale indefinitely. Yet how many medical students are taught with regard to the correct diagnosis of these very common conditions, and how many medical practitioners in India are conversant with their diagnosis?

The truth is that to-day dermatology is a much neglected science. Until recent years the subject of skin diseases in the tropics had received but scant attention. True, there have been certain pioneers in the subject—notably Professor A. Castellani, formerly of Ceylon, and now on the staff of the Ross Institute, Putney Heath, whose researches into the fungi of the skin are celebrated. But, taking the subject as a whole, confusion reigns supreme; nowhere is there order, systematic classification, or an attempt to clear up the muddle, and to replace "tropical skin diseases" by a science of tropical dermatology. Dermatologists are lovers of the obscure; they rejoice in Latin and Greek hybrid names; their classification in general is a purely clinical one; that a serious attempt should be made to investigate the underlying ætiological agents of the affections concerned rather than to add innumerable new diseases to an already overcrowded arena, does not appeal to them. The sections on diseases of the skin in Castellani and Chalmers' well known manual, in the eighth edition of Manson's *Tropical Diseases*, and especially in Vol. III of Byam and Archibald's *Practice of Medicine in the Tropics* represent the present state of the science, so far as it has developed.

The student and medical practitioner in India is thus befogged when it comes to skin diseases, although they constitute a most important part of his clinic. He is perforce driven back upon the many—and some of them admirable—text-books on skin diseases of the temperate zones. These diseases differ markedly from the skin diseases of the tropics for innumerable reasons, climatic, racial, and the like; and consequently errors abound. The Indian doctor knows but little Latin and less Greek, and a complicated terminology, born of the misuse of both languages, does not appeal to him. The clinical pictures presented by skin diseases in the tropics differ very widely from those presented by such diseases in temperate climes; yet a diagnosis must be made somehow; so a tuberculide is misdiagnosed as mycetoma, the interesting condition of dermatolysis as elephantiasis, and *Tinea cruris* of the palms as gouty eczema.

The first essential in any attempt to simplify matters and to introduce order, where at present there is chaos, is to bring in a simplification of the nomenclature and a systematic grouping of the different conditions under their respective ætiological agencies. Thus, as Colonel Acton shows in our current issue, *Tinea cruris* infection is by no means limited to the groin; it is not synonymous with "dhobi's itch," and such lesions as marginal eczema of the groin, "foot-tethers," mangoe toe, and cheiropompholyx are due to this infection. Further, the primary ringworm infection, whilst perhaps in itself unimportant, may open up different layers of the skin to secondary infection with septic cocci, and many very varied acute or chronic lesions of the skin may thus be induced. Unless the underlying ringworm infection is recognised and treated, such patients may carry on for years, undergoing treatment of many different kinds by many different consultants, none of whom recognises the primary and underlying infection.

It was this state of affairs that led in 1922 to the opening of the Skin Out-patient Clinic at the Calcutta School of Tropical Medicine. The results have been little short of miraculous. In 1922 some 200 patients were treated; in 1926 the number of patients treated was 2,480, whilst a modern and very fine *x*-ray and electro-therapeutic department in the Carmichael Hospital for Tropical Diseases has become largely subservient to the Department. The wealth of material which thus presents itself in Calcutta is unlimited. The Department is now financed by the Indian Research Fund Association; Dr. MacGuire is investigating the parasitic fungi of the skin, and Dr. G. Panja, the normal and morbid histology of the skin and its diseases; there are two whole time artists and a photographer; and the attempt is now being made to introduce order,

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systematic and ætiological classification, and investigation into one of the most difficult and neglected branches of the practice of medicine in the tropics.

The introduction of new and powerful derivatives of mercury, arsenic, antimony and the like metals has almost revolutionised the practice of dermatology. The endocrine products also have been found to be very potent with reference to one or more groups of skin diseases. Faced with this new situation, the old fashioned practitioner takes refuge in a confused terminology; he is concerned chiefly with labelling the condition by some technical term; the question of cure of the condition is of rather secondary and academic interest.

As far as we can judge from observation of what actually happens in medical practice in India, most medical practitioners are wont to send the majority of their skin disease patients first to the serologist for a Wassermann reaction. As a result the cases can be divided into two groups; those with a positive Wassermann reaction, and those with a negative reaction. Treatment for the first group is straightforward: for the second group some such diagnosis must be found as "pustular scabies" or "weeping eczema," or the first available text-book on skin diseases must be consulted, and the nearest illustration which fits the condition be accepted as the diagnosis.

As the result of five years' study of the various problems of tropical dermatology, Colonel Acton proposes a new classification of the skin diseases of the tropics in accordance with their ætiological causes. First, a group of skin diseases due to external infections; notably the ringworms, streptococcal dermatitis, staphylococcal dermatitis, scabies, seborrhœic dermatitis, and acne. Secondly, diseases which are the reflexion upon the skin surface of causes or diseases which are acting upon the internal viscera; such are pigmentary defects, embolic conditions such as psoriasis, skin diseases due to sensitiveness to certain foods or the result of certain intestinal infections, and diseases due to disturbance of the endocrine glands, especially of the thyroid gland. The third group consists of the granulomata; notably leprosy, syphilis, tuberculides, and other chronic infective granulomata. The fourth group are cutaneous tumours of special importance in tropical medicine. We require, in brief, a new classification of skin diseases of the tropics, a new code of therapy, a new and more rational study of both the normal and the diseased skin in the tropics.

Further, as Colonel Acton is wont to claim, skin diseases afford the most illuminating and interesting of fields for clinical research. Let us take the case of some visceral disease—let us say interstitial nephritis. To some extent we can measure the progress of the disease by biochemical tests, to some extent we can assess the value of different lines of treatment. But of the finer shades of metabolic disorder leading up to the production of such a condition we are chiefly in ignorance. On the other hand, in a cutaneous disease we have the complete picture of the disease presented to us on the skin in detail, and stage by stage. With regard to treatment we can at once assess whether a particular line of treatment is doing good or harm. We can assess values, progress or regress at once.

During the past five years Colonel Acton in the Skin Out-patient Department of the Calcutta School of Tropical Medicine has accumulated an enormous volume of clinical records, drawings, sketches, photographs, etc. There is here the beginning of an important contribution to the new science of tropical dermatology, as opposed to the old concept of "skins." The following figures, which he has kindly supplied, show the attendances at the Clinic in 1926 for the different ætiological conditions mentioned.

(1) *Skin diseases (proper) due to external causes.*

Ringworm	707 cases
Seborrhœic dermatitis and acne	214 ,,
Streptococcal dermatitis ..	194 ,,
Staphylococcal dermatitis and scabies	183 ,,
Chronic ulcers	35 ,,
TOTAL	1,333 cases

(2) *Skin diseases due to internal causes, reflected on the skin surface.*

Pigmentary defects ..	293 cases
Embolic causes, psoriasis, etc.	140 ,,
Cases associated with partial relationship to hypothyroidism	133 ,,
Cases due to sensitiveness to foods, etc.	35 ,,
TOTAL ..	601 cases

(3) *Granulomata.*

Leprosy	328 cases
Syphilis, including gummata	70 ,,
Tuberculides	18 ,,
Others	40 ,,
TOTAL ..	456 cases

(4) *Tumours, i.e., new growths* ..	40 cases
(5) Not classified as skin diseases, e.g., cheilitis, varicose veins, etc. ..	50 ,,
COMBINED TOTAL ..	2,480 cases

The above table includes only patients seen in the out-patient department, and is independent of

PLATE V.

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patients sent daily for consultation by different medical officers.

Certain broad facts emerge at once from this table. The first is the great frequency of early and undiagnosed cases of leprosy. Leprosy spares neither age, sex, nor race, though it is very uncommon in Europeans. Some 13 per cent. of Colonel Acton's skin out-patients are early undiagnosed cases of leprosy, cases that the ordinary medical student or practitioner has not until very recently been taught to diagnose. These cases—in fact the great majority of cases of leprosy—commence with a herald spot, a localised lesion. In the Department at the School when they are submitted to expert examination these cases are diagnosed at once. And it is precisely these early cases that are so amenable to treatment; it is precisely such cases that it is necessary to diagnose at the outset. In this matter the Department is rendering valuable service to the cause of the British Empire Leprosy Relief Association.

A second fact is the extreme importance of ringworm infection in tropical skin diseases. It is not so much perhaps the primary ringworm infection, as the secondary infections to which it gives rise by opening up different layers of the skin to invasion by septic cocci, that are of importance. Such cases constitute some 60 per cent. of all cases seen.

A third—and curious—feature of the figures is the relative paucity of syphilitic infections of the skin in an Indian population. Different authors have given from 12 to 25 per cent. of positive Wassermann reactions in a general Indian population; yet in the above table, syphilis appears as but a relatively small factor in tropical dermatology in general. But the experience of any one year may easily disturb such a balance.

A fourth and new factor, which Colonel Acton and Dr. Napier have entered into in detail in a forthcoming number of the *Indian Journal of Medical Research* is the comparative frequency of purely cutaneous lesions due to *Leishmania donovani*—the condition first described by Dr. Brahmachari as "dermal leishmanoid."

* * * *

Colonel Acton's Skin Clinic at the Calcutta School of Tropical Medicine marks an important advance. In place of the confusion of the old-time "skins," will emerge the orderly science of tropical dermatology. We should like to take this opportunity of congratulating him and his assistants on the splendid results of the past five years' work.

The article on *Tinea cruris* in our present issue is the first of the promised series, the others of which we hope will follow as opportunity permits. Articles which are in contemplation are on seborrhœic dermatitis, including acne and prickly heat: streptococcal dermatitis, including impetigo and "eczema": pigmentary defects, including leucoderma and chloasma; skin diseases due to sensitiveness to foods, etc., including the urticaria group: diseases due to partial thyroid defect, such as ichthyosis, scleroderma. follicularis, and morphœa; diseases of embolic origin, frequently due to lesions in the gut, and to reflex causes, such as lupus erythematosus and psoriasis: the differential diagnosis of the first lesions in leprosy: the tropical granulomata, such as those due to Leishmania infections, to spirochætal infections, and to tuberculosis: infective granulomata due to the rarer fungi; and the commoner skin tumours of the tropics, such as fibromata, von Recklinghausen's disease, and malignant growths.

There is already in Colonel Acton's clinic material for a series of papers in this journal, dealing with the common and more important skin diseases of the tropics, and for a second series in some more advanced and scientific journal dealing with the rarer conditions, such as the association of sarcoids with epidemic dropsy, and the Leishmania infections of the skin. We hope to publish this series of articles from time to time; and that their publication will be the prelude to the appearanceof at least two comprehensive works: a manual on the common and important skin diseases of the tropics for medical practitioners generally; and a systematic atlas of the skin diseases of the tropics, published from the material accumulated.

In the rise of this department we can at least assure our readers that they may see the end of the old attitude of neglect in India of skin diseases—which constitute so very important a part of the practice of medicine in the tropics—and the opening up of what is practically the new science of tropical dermatology.

THE ENGLISH DOCTOR IN THE MIDDLE AGES.

In a very fascinating book entitled "English Life in the Middle Ages" Mr. L. F. Salywan gives an interesting but all too brief account of the medical practitioner of the 14th century in England. At that period science was based on tradition and more respect was paid to the distorted translations of ancient writers than to observation and experiment. It was hardly safe to be a scientist; for example Roger Bacon, who lived in the reign of Henry III, was sent to prison by the authorities of the Church because he adopted experimental methods.

The only medical writer of note in the 14th century was John of Gaddesden, who actually incorporated his own personal experiences in his writings, but for the most part relied on the ancient Greek and Arabian authors. He recommended the use of charms of various kinds, and his prescriptions often contained 20 or 30 ingredients of vegetable or mineral origin, most of them quite inert. Some remedies which are still in use were mentioned in his books, and

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he is said by Mr. Salywan to be a type of the better class medical scientists of the time.

Another medical writer of the period lays great stress on the necessity for impressing the wisdom of the doctor on the patient; "if you do not know what is the matter, say that the patient is suffering from obstruction of the liver; be sure to use the word 'obstruction,' for they do not understand it, and it is often very useful that people should not understand what you say."

The wearing of certain precious stones was supposed to be of great preventive and curative value; thus a man in 1391 left a sapphire ring to a priest "so that it may be available for all who desire medical aid of the said ring." Scrofula, or the king's evil, was supposed to be cured by the touch of the king from the time of Edward the Confessor right down to the days of Queen Anne.

Astrology was one of the subjects of medical education, for by a knowledge of it the doctor could form a prognosis and could decide whether or not to bleed a patient, and from which vein to draw the blood. Bleeding was much in favour, and the monks in certain monasteries were bled as a routine five or six times a year and were given complete rest for three days after the operation.

The hospitals of the period were chiefly of two kinds; leper hospitals, of which there were many; and general hospitals, of which the best known is St. Bartholemew's, which was in existence 800 years ago. In mediæval times the hospitals provided beds, food, and spiritual advice, but there was little provision for medical attendance.

Of sanitation, there was none. The population was kept within the capacity of the food supply by epidemics, of which the most striking was the Black Death which killed one-third of the population. Infant mortality was terribly high; Henry III and Edward I each lost five children in infancy, but it is suggested that some of the deaths were due to the well meant but dangerous treatment of the doctors of the time. The first Sanitation Act was passed in 1388; it consisted of a prohibition of the pollution of rivers, ditches and open spaces. We read that the various town authorities made constant efforts to improve the insanitary conditions which prevailed, but were handicapped by the fatalism of the uneducated classes who regarded disease as an act of God and would make no effort to avoid it.

The reader of Mr. Salywan's book cannot help being struck by the resemblance between the condition of England in the Middle Ages and that of many parts of India to-day. The remedy in England was education. The same remedy is likely to be effective in India, provided that the education is directed towards a definite object.

J. W. D. M.

Current Topics.

The Far Eastern Association of Tropical Medicine, Seventh Congress, 1927.

Preparations for the Seventh Congress of the Far Eastern Association of Tropical Medicine, to be held in Calcutta in December, 1927, are now well in hand. The Governors of the different Provinces in India have all honoured the Congress by intimating their willingness to be Vice-Patrons; as have also the following: H. E. the Commander-in-Chief; the Maharajahs of Baroda, Jammu & Kashmir, Bikaner, Jodhpur, and Patiala; H. H. the Maharaj-Rana of Dholpur; H. H. the Maharaj-Rana of Jhapawar; H. H. the Thakur Saheb of Gondol; the Maharajadhiraja of Darbhanga; the Raja of Parlakmedi; the Hon. Sir Alexander Muddiman; Sir Mahammad Habibullah; Sir G. Rainy; Sir Basil Blackett; Mr. S. R. Das and H. E. the Naval Commander-in-Chief. Several generous donations to the Congress funds have also been received, which include Rs. 3,000 from H. H. the Maharajah of Baroda and Rs. 250 from H. H. the Maharaj-Rana of Jhalawar. In view of the international importance of the Congress and the status which it will give India in international medicine, it is hoped that these generous examples may be followed by others.

Of the first circular with reference to the Congress approximately 29,000 copies have been issued to the medical, veterinary, and dental professions in India, and some 4,700 to other countries. A general guide book is in preparation under the editorship of Lieut.-Col. S. R. Christophers, F.R.S., I.M.S. It is to consist of approximately 190 pp. and includes a general description of India, a short resumé of Indian history, and a special resumé of the history of medicine in India. Other sections deal with the indigenous systems of medicine in India, India's medical and sanitary problems, medical organisation and research in India, medical institutions in this country, veterinary science in India, with brief sections on Indian education, ethnology, archæology, zoology, botany, geology, and Indian art. A second publication, a special guide to the Congress, is proposed; to include information with regard to the Congress programme, steamers, trains, accommodation, tours and excursions, and maps of Calcutta and of the Congress grounds; this will serve as a souvenir of the Congress.

Up to date over 500 applications for membership have been received from all India. Considering the exceedingly important part which this Congress is likely to play in the development of medicine in India, and its wide international status, this response so far must be regarded as disappointing. We hope that the medical profession in this country will wake up to the great importance of the occasion, and that a better response will soon be forthcoming.

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It has been decided to hold the Congress in the grounds of the Medical College, Calcutta, and in the Calcutta School of Tropical Medicine. The Vice-Chancellor and Syndicate of the University of Calcutta have very kindly placed the use of the Senate Hall at the disposal of the Congress for the opening and closing meetings; whilst an At Home is being organised jointly by the Asiatic Society of Bengal and the Trustees of the Indian Museum. For the commercial side of the exhibition the site selected is that between the Carmichael Hospital for Tropical Diseases and the new Eye Hospital, and it is hoped that this will accommodate at least 30 stalls. The scientific and professional side of the exhibition will be arranged in the Calcutta School of Tropical Medicine, in one or two wards of the Carmichael Hospital for Tropical Diseases, with possibly an overflow in the Medical College Hospital. Designs for a special Congress badge are being prepared. The ribbon will be light blue. These badges will be issued to each member of the Congress in due course.

After the termination of the meetings in Calcutta a series of tours are proposed for the period December 11th to 22nd. These will include a Northern tour visiting Benares, Lucknow, Delhi, Lahore, Kasauli, and Agra; and a Southern tour to the Madras Presidency. Both tours will meet in Bombay. Smaller tours in Bihar and Orissa, and Eastern Bengal and Assam are also under consideration. The Congress will end on December the 22nd. The Government of India have invited 53 official delegates from the various foreign countries in the Far East, and these, together with other foreign members, will form the majority of those proceeding on the tours. Special railway concessions, which vary between the issue of a return ticket for a single fare or 1½ fares, have been granted to delegates travelling to and from the Congress by the E. I. Ry., E. B. Ry., S. I. Ry., B. B. & C. I. Ry., M. & S. M. Ry., B. N.-W. Ry., Jodhpur Ry., Burma Ry., Assam-Bengal Ry., B.-N. Ry., and the B. I. S. N. Co.

Two influential sub-committees composed of ladies and gentlemen under the chairmanship of Lieut.-Col. F. A. F. Barnardo, C.I.E., C.B.E., I.M.S., and Dr. Kedarnath Das, C.I.E., have undertaken the organisation for the accommodation of the delegates and members while in Calcutta. These arrangements are already well advanced. A special publicity sub-committee has also been formed in Calcutta with a view to arousing interest in the Congress in the Indian press.

In a previous note on the Congress, we made an unfortunate slip in referring to it as a "bi-annual" institution; the correct word should have been "biennial," since the Congress is held every other year.

Such, briefly, is the present position with regard to the forthcoming Congress, and it tells a tale of very efficient organisation and preparation. We regret, however, that the response from the general medical profession in India so far has been rather discouraging. The Fifth Congress, held at Singapore in 1923, was an extremely successful one and aroused widespread interest in the splendid medical work done in the Federated Malay States. The Sixth Congress, held at Tokyo in 1925, was characterised by the unbounded hospitality of the Japanese, who laid themselves out to make the Congress a splendid success. It was also characterised by the discussion of many public health matters of international importance in the Far East. It is "up to" India to make the Seventh Congress equally successful, and we can only impress again upon our readers the importance of the occasion, and the international status of the Congress. It only remains to add that the General Organising Secretary for India is Lieut.-Col. J. Cunningham, I.M.S., Pasteur Institute of India, Kasauli, and the Local Secretary for Calcutta (and for the exhibition) Lieut.-Col. A. D. Stewart, I.M.S., Calcutta School of Tropical Medicine; to whom enquiries should be addressed.

The Constitutional Factor in Disease.

By A. F. HURST, M.A., M.D., F.R.C.P.

(*British Med. Journ.*, 7th May, 1927, p. 823.)

THIS address is so instructive and important that we give very full abstracts from it.

Dr. Hurst opened his address by pointing out that during the last twenty-five years the great advances in knowledge which have followed the application of bacteriological, biochemical, and physical methods to the investigation of disease have led to the comparative neglect of the constitutional factor.

He did not think it possible to improve upon Draper's conception of constitution as the sum of the anatomical, physiological, immunological and psychological characters with which each individual is born. These depend in part upon heredity and in part upon other factors the nature of which is quite unknown. Acquired characteristics do not play any part in what he understood by the term constitution, though in the course of years they may profoundly influence it.

It is natural that considerable variations should occur among different normal individuals in each of Draper's four "panels" of constitution—anatomical, physiological, immunological and psychological; many conditions formerly regarded as pathological are indeed nothing more than extreme examples of such normal variations. Some of these variations may be advantageous to the individual, whereas others may make him more liable than the average person to develop certain diseases. It is the latter type of variations that constitute diatheses, which may be defined as the inborn and often inherited characteristics which make an individual liable to react to physical, chemical, or psychological stimuli in such a manner that a condition of disease results.

Though atonic dilatation of the stomach was a common diagnosis before the days of *x*-rays, and though hypotonus is still frequently diagnosed by radiologists, the condition is rare and Dr. Hurst doubts whether it ever really occurs. The term "dropped stomach" is incorrect. The condition thus described is quite common in healthy people with excellent abdominal muscles who have always been thin, and it also occurs, though less frequently, in comparatively stout individuals. On the other hand, the so-called hypertonic stomach may exist in people who have lost much weight and whose abdominal muscles have become very weak; nothing, in fact, will make such a stomach drop materially, just as nothing will make the so-called dropped stomach rise to the level of the

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average stomach. There are great variations in the normal length of the stomach, just as there are great variations in the normal length of the trunk and the limbs; according to Faber, measurements on the *x*-ray screen show that the length of the stomach of normal individuals varies between 18 and 84 cm.

The stomach, if short, assumes the diagonal or almost horizontal position of the so-called hypertonic stomach; if long, it assumes the vertical position with the steeply ascending pyloric part of the so-called dropped stomach. These types of stomachs should be re-named respectively the "short stomach" and the "long stomach," and they should be regarded as nothing more than normal anatomical variations from the stomach of average length.

(*b*) *Variations in Gastric Secretion.*

All the earlier investigations on gastric secretion were carried out on patients suffering from disorders of the stomach. It is therefore not surprising that hyperchlorhydria was regarded as a pathological condition, sometimes secondary to gastric ulcer and sometimes primary; achlorhydria was also thought to be always pathological, and a result of cancer of the stomach or gastritis. The introduction of the fractional test meal by Rehfuss and his colleagues, and their investigations, together with those of Bennett and Ryle on normal individuals, have shown that both hyperchlorhydria and achlorhydria are simply extreme variations from the average normal secretion, occurring respectively in about 10 and 4 per cent. of healthy people. They are therefore constitutional conditions, and are compatible with perfectly good health. It is doubtful whether hyperchlorhydria is ever a secondary condition, though achlorhydria is not an uncommon result of gastritis and carcinoma of the stomach. Hyperchlorhydria predisposes to duodenal ulcer, but does not result from it; its supposed association with gastric ulcer is now known to be a myth.

Gastric Diatheses.

Campbell and Conybeare have shown that the short stomach is often associated with hyperchlorhydria, and occurs most commonly in the hypersthenic type of individual. Dr. Hurst described the condition in which this short rapidly emptying stomach, which secretes an abundant and very acid juice, occurs as the *hypersthenic gastric diathesis.*

The long stomach is generally associated with a normal or low gastric acidity, it occurs especially in individuals of asthenic type with long chests and narrow intercostal angle. It may appropriately be referred to as the *hyposthenic gastric diathesis.*

In normal individuals the stomach contains food throughout the day, whereas in those with the hypersthenic gastric diathesis there are several hours in which it is empty except for the continuous secretion of acid gastric juice. Many of the latter individuals are habitually hungry already three hours after a meal, and for this reason they may form the habit of taking a little food or drink at such times. If this is not done, the duodenal bulb is bathed with very acid juice for several hours each day; when for any reason an acute ulcer develops in the duodenal bulb of such an individual, instead of healing very rapidly without the production of symptoms, as it would in an average person, a chronic ulcer is likely to form. The hypersthenic gastric diathesis is, in fact, the essential predisposing cause of duodenal ulcer.

As the diathesis is frequently familial, duodenal ulcer also often occurs in more than one member of a family.

The hyposthenic gastric diathesis probably bears a similar relation to gastric ulcer; as it is also familial, gastric ulcer frequently occurs in more than one member of the same family.

The relative frequency of the two diatheses in men and women in health found by Moody and his colleagues explains both the greater incidence of duodenal than gastric ulcer and the relative frequency of the two conditions in men and women, especially when the effect of excessive smoking, which is rare in women, on the pathogenesis of duodenal ulcer is also taken into account.

The third gastric diathesis is termed Constitutional Achylia Gastrica.

Achlorhydria was present in 4 out of the 100 normal students examined by Bennett and Ryle. It occurs in early childhood and is often present in several members of a family.

Many people who are known to have had complete achlorhydria for many years, and perhaps for all their lives, are apparently none the worse for it. The chief digestive symptoms are nausea, flatulence, and heartburn, with vague epigastric discomfort; diarrhœa is very common, achlorhydria being the most frequent cause of intermittent attacks of diarrhœa lasting for many years. The dyspepsia of achlorhydria is often associated with acne rosacea, which, like the dyspepsia, is rapidly cured by the administration of acid.

The absence of hydrochloric acid must predispose to infections derived from food or water, such as typhoid fever and bacillary and amœbic dysentery. Streptococcal infection of the cæcum from the mouth or nasopharynx often leads to chronic appendicitis, achlorhydria being found in 33 per cent. of cases.

Knott has shown that achlorhydria allows the access of bacteria from the mouth to the duodenum, and by causing an increase in the alkalinity of the small intestines, it permits bacteria to spread from the colon to the small intestines, the reaction of which normally inhibits their development. The consequent invasion of the duodenum with pathogenic strains of *B. coli* often leads to ascending infection of the biliary passages; thus achlorhydria is found in about 25 per cent. of patients with cholecystitis and 49 per cent. with gall-stones.

In rheumatoid arthritis if the primary oral or nasopharyngeal sepsis is associated with achlorhydria secondary streptococcal infection of the intestines occurs; this is found in about 40 per cent. of cases, and especially in the severe and chronic, in which incomplete recovery or relapses follow eradication of the primary foci of infection.

The only disease in which achlorhydria is always or almost always present is the syndrome of Addison's anæmia, sub-acute combined degeneration of the spinal cord, and Hunterian glossitis.

The achlorhydria precedes the development of the disease: 21 cases have now been recorded in which it was known to be present from one to twenty-five years before the onset of symptoms, analysis of 43 private cases of the syndrome Mr. Hurst found that in 6 (14 per cent.) the achlorhydria was clearly secondary to gastritis arising from food poisoning. In 3 cases it was secondary to alcoholic gastritis and in 2 to cancer of the stomach, others have been recorded in which it followed gastroenterostomy and complete gastrectomy. In the remaining cases he believes it is due to the constitutional achylia gastrica, which occurs in about 4 per cent. of normal people, although only a small proportion of these ever develop the disease. The brothers, sisters, and children of patients with the syndrome should be given test meals. If they are found to have achlorhydria, they should, in common with everybody else in whom the condition is discovered, be advised to take a drachm or more of hydrochloric acid, fasting, in the morning and at lunch and dinner for the rest of their lives; given with sweetened orangeade or syrup of grenadine it makes a very palatable beverage. Such an acid drink would provide an admirable prophylactic measure in the tropics against enteric, dysenteric, and other intestinal infections among individuals predisposed to them on account of constitutional achylia or hypochlorhydria.

The prevention and treatment of pyorrhœa alveolaris and nasopharyngeal sepsis are doubly important in patients with any one of the three gastric diatheses, in whom the sepsis may act as the exciting cause of some serious disease.

In the case of the hypersthenic diathesis, intermediate feeds are desirable, and smoking should be kept within strict limits, as it is the most important single exciting

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cause of duodenal ulcer. In such individuals the slightest indigestion calls for a thorough physical and radiological investigation and examination of the stools for occult blood; if this is done, an ulcer should be discovered in the early and easily curable stage.

When a patient has recovered from a gastric or duodenal ulcer as a result of medical treatment and the removal of all foci of infection, it is essential that he should be given definite instructions with regard to diet, intermediate feeds, and restriction of tobacco and alcohol, which he must follow for the rest of his life; he should be told that he has the ulcer diathesis, and that there is likely to be a recurrence unless he strictly follows the directions he has been given.

When a patient recovers from Addison's anæmia, as shown by the normal blood picture (except sometimes for persistent megalocytosis) and negative van den Bergh's test, it is often said that his recovery is only apparent and a relapse is inevitable. The truth is that he has recovered from the disease, but not the diathesis; he is therefore likely to reinfect his intestines and develop a new hæmolytic or neurotoxic attack, just as patients with the hypersthenic gastric diathesis who have recovered from duodenal ulcer are likely to develop a new one, unless sufficient care is taken. It is therefore essential that he should continue to take acid, however well he may feel, and he should have his mouth, throat, and nose periodically inspected in order to arrest the development of any new focus of infection at the earliest possible moment.

Gall-stones are found with greater frequency in men than in women. The bodies of about 10 per cent. of all people dying in adult life contain gall-stones.

Cholecystitis is the only indisputable predisposing cause of gall-stones. Common as gall-stones are, cholecystitis is still more common, but why some patients with the latter should develop stones while others do not remains a mystery.

The inherited predisposition to diabetes has long been known. Combining the investigations of Williamson on 300 cases and Barach on 350 cases, 22 per cent. had a history of diabetes in one or more members of their family; as diabetes is the cause of about 1 per cent. of all deaths, it is clear that coincidence could account for not more than one-half of these family histories.

In 40 per cent. of Williamson's 300 cases of diabetes there was a history of mental anxiety, worry, or sudden shock; in a quarter of these there was also a family history of diabetes. In 31 per cent. of the same series the patients had for long periods indulged in great excess of sugar or sweet food and drink, though not of starch; in a quarter of these there was also a family history of diabetes. Allowing for 9 patients in whom all three factors were present, an emotional or dietetic exciting cause existed in 47 of the 76 (62 per cent.) with a family history of diabetes. It is clear, therefore, that individuals with a diabetic family history ought, as far as possible, to avoid occupations which are likely to involve much mental stress, and they should be specially instructed to be very moderate in their consumption of sugar. It should also be remembered that acute infections, such as influenza, are not infrequently the exciting cause of diabetes; consequently the urine should be examined for sugar after, as well as during, such illnesses; this, of course, applies to everybody and not merely to those with a family history of diabetes.

CONSTITUTIONAL VARIATIONS IN THE REACTION OF THE URINE.

(a) *Nephritis.*

Osman has recently shown that a special liability to the development of nephritis is present in individuals with a high acidity of the urine. Thus among 109 patients with scarlet fever, investigated with Dr. C. K. Colwill at the Monsall Fever Hospital, 14 out of 21 (66 per cent.) with a high urinary acidity (under 5 pH), but only 3 out of 88 (3.4 per cent.) with a low urinary acidity (over 5 pH), developed albuminuria or nephritis. In another series of observations on 431 cases of scarlet fever at Park Fever Hospital, Osman and Woodfield found that the liability to albuminuria and nephritis could be almost completely overcome by giving 15 grains each of potassium citrate and sodium bicarbonate three times a day in order to keep the urine more or less alkaline.

The reaction of the urine of members of a family with a tendency to nephritis should be examined, and, if the acidity is high, they should constantly take alkalis; and, quite apart from the question of the alkaline treatment of nephritis recommended by Osman, the well-known tendency to recurrence under unfavourable conditions in individuals who have once had nephritis could perhaps be overcome by the constant use of sufficient potassium citrate to keep the urine alkaline.

(b) *Phosphaturia and Phosphatic Calculi.*

Just as the urine in some individuals tends to be more acid than the average, so in others it tends to be more alkaline, the tendency being exaggerated during periods of mental strain and overwork. At such times the urine passed at the end of micturition may be milky, owing to a deposit of phosphates occurring in the urine whilst still in the bladder.

It is natural that individuals with this constitutional condition should be liable to develop phosphatic calculi.

It seems reasonable to advise all patients whose urine is constantly alkaline, or who have ever passed a phosphatic calculus, to take sufficient acid sodium phosphate to keep their urine acid. If this is done, small phosphatic stones, which are not causing any obstruction to the urinary flow, and which are therefore subjected to the action of the urine flowing over them, might reasonably be expected to dissolve.

Blood Pressure and Constitution.

Discussions on abnormal blood pressure have in the past suffered from our ignorance as to what constitutes the normal.

In healthy individuals of the same age, sex, and race considerable variations occur. Thus Alvarez and his associates found that among the students they examined 2.77 per cent. men and 11.74 per cent. women had a systolic blood pressure less than 105 mm., and 20.81 per cent men and 3.75 per cent. women had a blood pressure over 140 mm. It is, of course, impossible to draw exact lines above and below which the blood pressure should be regarded as abnormal.

There is no doubt that the tendency to hyperpiesia is hereditary.

The tendency to hypopiesia is probably inherited with equal frequency. The actual cause of the high or low blood pressure is quite unknown, though it is probably, at any rate in part, due to variations in the activity of such internally secreting organs as the suprarenal, the pituitary, and the thyroid glands.

Hyperpiesia and hypopiesia should be regarded as constitutional conditions or diatheses, being simply extreme degrees of variation from the average normal. They are not diseases and need never give rise to symptoms, but an individual with either condition is apt to react in a special way to toxæmias and to mental and physical fatigue.

(a) *Hyperpiesia.*

Too much time has been expended in looking for some toxic cause, when in reality true hyperpiesia, as distinct from the high blood pressure secondary to chronic renal disease, is not a malady but a diathesis—a constitutional inherited condition.

Ryle has pointed out that the stout, healthy looking, John Bull type of individual is generally the subject of hyperpiesia, which is not acquired but is inborn. Among his patients with hyperpiesia 62 per cent. were of this type, 18 per cent. of average build, 4 per cent. "lean and nervous," and 16 per cent. of poor physique. The question might arise whether the exceptions were really suffering from primary hyperpiesia; in the lean and nervous individual a high blood pressure is generally secondary to the mental state. During the war, in cases of functional hyperthyroidism associated with a high

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blood pressure, simple hypnosis often resulted in an immediate fall, amounting even to 45 mm., when the state of anxiety in which the patient lived was temporarily removed.

Hyperpiesia is often an accidental discovery in an apparently healthy man of exceptional mental and physical vigour. But sooner or later symptoms appear, generally as a result of mental or physical overwork, prolonged worry, excess of food and drink and perhaps of tobacco, or an acute or chronic infection. In women symptoms may develop at the menopause.

The symptoms are generally not due to the high blood pressure itself, but to its effects on the blood vessels or heart. Thus arterio-sclerosis impairs the blood supply to various organs, such as the brain and kidneys.

When symptoms once appear in people with hyperpiesia the prognosis is never good, as there is an ever-present danger of death from cerebral hæmorrhage or cardiac defect, though this may of course not occur for several years.

(b) Hypopiesia.

Although hypopiesia—an abnormally low blood pressure occurring independently of any organic disease—is as common as hyperpiesia, much less attention has been paid to it. It may be defined as a constitutional and often inherited condition, in which the systolic blood pressure is permanently below 105 mm. in men and below 100 mm. in women, without recognizable cause, such as tuberculosis, circulatory failure, severe anæmia, hypothyroidism, or Addison's disease. It is often discovered accidentally in perfectly healthy individuals. They are often of hyposthenic habitus—thin, slouching, with long and narrow chests and acute epigastric angle. They are rarely athletic, and they generally choose a sedentary occupation.

Though not actually ill, the hypopietic is rarely very well. His most common symptoms are undue liability to mental and physical fatigue and a general lack of endurance, which is often in striking contrast with the heroic efforts he makes to carry on in spite of his disability. He is often subject to headaches, especially in the occipital region, and to attacks of vertigo, and more rarely of palpitation and syncope. He is generally pale, though not anæmic, and suffers from cold extremities.

Fisher found that the mortality of 3,589 persons, aged between 16 and 60, accepted for insurance, who had a systolic blood pressure of 100 mm. or less, was 35 per cent. of the expected mortality according to the standard American tables, whereas the general mortality among those insured by the company was 80 per cent. of the expected rate.

Treatment of Hyperpiesia and Hypopiesia.

People with hyperpiesia and hypopiesia should be made to understand that they are not suffering from a disease

The hyperpietic should be taught to restrict his exercise within more moderate bounds than those to which he has probably been accustomed, the hypopietic should be urged to take as much exercise in the open air as he can without exhaustion.

Whereas the hyperpietic should be strictly moderate in his consumption of tobacco, alcohol, and coffee, and should even give them up entirely if previously taken in excess, such restrictions are rarely called for with the hypopietic; a cup of black coffee and a pipe after dinner and an occasional half-bottle of champagne will materially help him to enjoy work which would otherwise require an almost intolerable effort. Restriction in the quantity of food, which should be as largely vegetarian as possible, for the stout and plethoric hyperpietic is essential, whereas the thin hypopietic should be urged to eat plentifully without restrictions as to the consumption of meat.

Hyperpietic patients, who have more than the normal percentage of hæmoglobin may benefit greatly from periodic bleeding, though it does not appear to lower their blood pressure; when well marked plethora is present the application of deep x-rays to the long bones may throw out of action sufficient red marrow to reduce the number of blood corpuscles to normal limits, and at the same time cause a definite fall in blood pressure.

The Constitutional Factor in Asthma, Epilepsy, and Migraine.

Several years ago Dr. Hurst defined asthma as a condition in which that part of the vagal nucleus which controls the motor and secretory activity of the bronchi is abnormally sensitive to chemical, reflex, and psychical stimuli. The importance of this definition lies in the recognition of the sensitive bronchial centre.

More recently the work of a number of investigators in England and America and on the Continent has directed attention to the importance of specific hypersensibility to the proteins of bacteria, food, animal emanations, and pollens, and most of the recent literature on asthma would lead one to suppose that in this—the "toxic idiopathy" of Freeman—is to be found the whole explanation of asthma.

Attacks of asthma may, in fact, be caused by a great variety of reflex and chemical stimuli, as well as occasionally by psychological stimuli, but only if the individual has the asthmatic constitution, which manifests itself in an irritable bronchial centre, this being the one essential factor in the pathogenesis of asthma. It was inherited in 49 per cent. of 1,129 cases collected from various sources, compared with only 7 per cent. of 115 controls, and it is interesting to note that an individual may inherit it and transmit it to his children, without ever having an attack of asthma himself owing to the absence of the three groups of exciting causes.

Migraine also depends upon a constitutional and frequently inherited irritable focus in the brain, which gives rise to headache, disturbances in vision, and gastric symptoms; there was a family history of migraine in 30 out of Bramwell's 54 cases (55.6 per cent.). In migraine the usual stimulus is ocular, and a very thorough investigation in numerous cases has invariably failed to reveal anything in the nature of alimentary toxæmia, hepatic insufficiency or a toxic idiopathy, which could be held responsible, in spite of the fact that on theoretical grounds these have frequently been suggested as the exciting causes of attacks.

"The only cure of asthma is not to have it." The same is true of epilepsy and migraine. The longer a patient can be kept free from attacks by any form of treatment, the less irritable his abnormal nerve centre becomes, though it is doubtful whether the constitutional hypersensitiveness is ever entirely lost in asthma or epilepsy, though with advancing years the complete cessation of migraine attacks is not uncommon.

Many epileptics relapse directly they give up taking bromide, which they had been told they could discontinue after they had been free from attacks for one, two, or three years. It is true that the liability to attacks steadily diminishes as the period of freedom lengthens, but nobody who has once suffered from epilepsy should ever discontinue the use of small doses of bromide or luminal, even if he remains free from fits for five or ten years.

Back to Medicine, (General Medical Practice and the Medical Curriculum.)

By J. M. MUNRO KERR, M.D.

(*British Med. Jour.*, 14th May, 1927, p. 870.)

DR. MUNRO KERR, Regius Professor of Midwifery of Glasgow University gave an inaugural address on general medical practice and the medical curriculum. Dr. Kerr takes the view that the course of studies is already overloaded and he suggests that if we are to avoid an increase in the length of the curriculum a readjustment is necessary.

It is held that the future of general practice lies more and more in the direction of pure medicine; surgery and obstetrics are being relegated to those who have specialised in these subjects, just as ophthalmology and dentistry are already regarded as being outdside the general practitioner's province. Dr. Kerr goes on to say: "In obstetrics the student should be trained to have

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a general conception of obstetric and gynæcological problems, and to be able to deal with ordinary deliveries. If he wishes to do more, he must have special post-graduate instruction and practical experience. The duration of this training need not be longer than three months, provided he gives up his whole time to the subjects of obstetrics and gynæcology. This was the recommendation of the Scottish sub-committee which dealt with this part of the curriculum in 1922. There may be said to be two opposing camps—one which aims at an extended training and a very thorough experience in obstetrics, so that the young graduate may be able to undertake almost any operation in obstetrics; this is especially advocated in some of the schools of America. The other school views matters quite differently. Its policy is to train the undergraduate only to a moderate extent. This type of training pertains to such countries as France, Sweden and Denmark. These countries are aiming at an obstetric practice carried on by particularly educated and well-trained midwives, assisted in cases of difficulty and supervised by specialists or specially trained accoucheurs distributed over the country. The great fault of the present system is that the student is not "steeped" sufficiently in clinical work; and this clinical experience and training should be as thorough in the outdoor department as in the wards, because so many minor ailments and early phases of disease are only seen in the outdoor department.

Professor Kerr suggested "*that clinical training in medicine should be increased, and that possibly clinical training in surgery might be lessened.* The clinical training of the undergraduate in medicine is not sufficient for present-day requirements. Further, ophthalmology certainly, and possibly some of the other medical specialties, should be given greater consideration.

Surgery is on a very different footing. No one to-day attempts to practice surgery seriously without some special post-graduate training. The great surgical principles, the possibilities of surgery, surgical pathology—these are the subjects to which the medical undergraduate's attention should be directed. The craft of surgery can only be learnt after graduation. The training of the undergraduate in surgery might with advantage be modified to suit the requirements of general practice of to-day. The same applies to the surgical specialties."

Dr. Kerr's views deserve the fullest attention. A complete and thorough knowledge of all the branches of medical practice is entirely unattainable by any student, however industrious and gifted he may be. The problem of a suitable medical curriculum can only be solved if we ask ourselves the questions—

(1) What diseases of importance will the student have to diagnose and treat in his post-graduate days?

(2) How best can he be trained so that he will be able to perform efficiently the duties which will fall to him?

At present the policy seems to be based on the idea that it is necessary to teach the student everything that has been taught in the past, as well as everything additional that can be suggested by the specialists in all the branches of medical work.

The Spahlinger Treatment for Tuberculosis. Report of the Medical Committee of the Welsh National Medical Association.

(*British Med. Journ.*, 7th May, 1927, p. 851.)

The Medical Committee stated that it had met on three occasions, and had considered reports from the Clinical Sub-committee, from the Bacteriological Sub-committee, from the General Purposes Sub-committee, and from certain members of the staff of the Memorial Association who went to Geneva in May, 1926. These reports were presented to the council, but have not yet been issued for publication. The Medical Committee submitted to the council the following observations as its general conclusions:

(*a*) *Technical.*

While it is evident that M. Spahlinger has created a modern laboratory at Carouge, and has shown much ability in devising apparatus for special branches of bacteriology, the secrecy maintained as to fundamental details of technique renders it almost impossible to judge of the value of his work. He claims to have made achievements far in advance of modern knowledge, but has, up to the present, produced no adequate evidence in substantiation of these claims. Whether from technical or financial reasons, it is clear that all attempts to obtain supplies of the Spahlinger preparations for systematic tests by competent authorities have failed.

(*b*) *Clinical.*

The published records and statistics of the cases treated by the Spahlinger remedies are not nearly complete or precise enough to allow of a scientific evaluation of the results of treatment. Based on such evidence and records as are available these results are inconclusive. In those cases where the results are good these can easily be paralleled by other methods.

The report made by certain members of the medical staff of the association, after their visit to Geneva, on cases actually examined and investigated by them, shows that in this series the results are, on the whole, disappointing, especially in view of the claims made. The remedies obviously do not offer a "certain" cure for tuberculosis, and conclusive evidence has not been forthcoming that they have materially altered the course of the disease.

With regard to the advisability of undertaking organized clinical tests, we feel that M. Spahlinger's preparations are on exactly the same basis as any other unproved remedy. There is some, but no conclusive evidence to justify such tests, if only because in a few cases there was considerable improvement during the period of treatment. We can but reiterate the attitude adopted by the council in its resolution passed on April 23rd, 1926, as follows:

"That in view of the fact that M. Spahlinger has promised supplies of his remedy to the Ministry of Health for investigation, and that the material will be placed at the disposal of the Ministry in the first instance, who have promised to make a full investigation (in which the association may probably be asked to participate), it will be well for the association to await the inquiry promised by the Ministry.

"In the event of the association being invited so to act, that they accept the terms and conditions of the Ministry in regard to such inquiry, provided that full information as to the nature and strength of the remedies be given in confidence to the medical staff."

(*c*) *General.*

The application of public or other funds towards the Spahlinger Institute cannot be recommended by this committee.

The publicity campaign on behalf of the Spahlinger movement is to be deprecated as unjustified by the evidence so far adduced and to be deplored as raising false hopes in the minds of sufferers from tuberculosis.

Aid in the diagnosis of Typhoid Fever : A New Laboratory method.

By C. A. MILLS

and

K. V. KITZMILLER.

(*Arch. of Int. Med.*, October, 1926.)

Mills and Kitzmiller describe the production of excess of antithrombin during the febrile stage of typhoid fever. They state that the phenomenon is specific for typhoid and believe that it will form a useful differential diagnostic point from other fevers, particularly from acute miliary tuberculosis in which the antithrombin content of the blood is less than normal. It is also claimed that a logical basis for the hæmorrhagic tendency in typhoid is thus established.

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Some points in the Surgery of Gastric and Duodenal ulcers.

By H. S. SOUTTAR, D.M., M.Ch., F.R.C.S.

(*British Med. Journ.*, March 19, 1927, p. 501.)

OVER 4 per cent. of all cases admitted to the surgical wards of a large general hospital suffer from gastric or duodenal ulcers: the disease is therefore a common one. The incidence differs in the two sexes; thus in a series of 660 cases of gastric ulcer, 70 per cent. occurred in men, while in a series of 615 duodenal ulcers, the male incidence was no less than 86 per cent.

The most frequent site of chronic gastric ulcer is on the lesser curvature of the stomach near the pylorus and on the posterior wall of the viscus. The actual cause of the condition is still unknown: the mucous membrane alone is primarily involved, but this is rapidly followed by implication of the submucous and muscular coats with the formation of a funnel-shaped ulcer extending through the whole thickness of the wall. The tissues around became densely infiltrated and adhesions may occur to the liver, pancreas, or transverse mesocolon.

The pathology of duodenal ulcers is similar: they occur most frequently on the posterior surface at the junction of the first and second parts of the duodenum.

The relationship of gastric ulcer to cancer of the stomach is still controversial, but Souttar thinks that development of carcinoma on the site of a chronic ulcer is by no means common.

Regarding symptomatology—chronic gastric ulcer is most common in men between 40 and 50: the outstanding symptom is pain in the epigastrium coming on at a definite interval after food: this pain is at first colicky in nature and its maximal intensity has been found to coincide with the period at which the acidity of the gastric contents is also maximal. The inter-relationship between pain and acidity is most marked in cases of duodenal ulcer, where the pain comes on about 1½ hours after food. The taking of more food—by neutralising the hyperacidity—frequently affords relief. These so-called "hunger-pains" are very characteristic of duodenal ulcer. Coincident with the involvement of deeper structures, the type of pain may change from being intermittent and colicky to a fixed, burning pain in the back.

Vomiting is sometimes a prominent symptom, and not infrequently it affords temporary relief from pain. Hæmatemesis is common, and may occur in all degrees of severity.

Diagnosis rests on (1) the examination of a test-meal, (2) radiographic investigations. The most important complications are—(1) Involvement of surrounding organs, especially the liver and pancreas. (2) Pyloric obstruction. (3) Hour-glass contraction. (4) Carcinoma.

With reference to treatment—medical measures may alleviate symptoms, but for a radical cure of the condition Souttar believes that surgical interference is essential. For the ordinary uncomplicated type, posterior gastro-enterostomy is the operation of choice: where there is extensive involvement of liver and pancreas, a partial gastrectomy by Poyla's method may be called for. In the case of the small minority where the ulcer is situated high up on the lesser curvature, Souttar recommends a Schoumaker gastrectomy.

(This necessarily sketchy outline deals only with the salient points of a valuable paper and one which will well repay further study).

The diagnosis and treatment of Gonorrhoea.

By COL. LAWRENCE W. HARRISON, D.S.O., M.B., Ch.B. (Glasgow), F.R.C.P. (Edin.),

(*Glasgow Med. Journ.*, April 1927, p. 201.)

HARRISON emphasises the following points in the diagnosis and treatment of gonorrhœa:—(1) the importance of microscopic examination to confirm or refute a diagnosis of gonorrhœa made clinically. (2) Cultural methods are valuable, especially in female patients. (3) The complement fixation test is an important adjuvant; slides and cultures may be negative owing to the gonococci being "locked up" in the prostate or paraurethral canals: the presence of a positive complement deviation test shews that infection is still present. It is not, however, so reliable as the Wassermann test in syphilis.

On the clinical side, Harrison states that it is most important in cases of chronic gleet in the male to discover whether or not the posterior urethra is involved. For this purpose, the two-glass test as ordinarily performed is quite unreliable. The anterior urethra should be washed out first thing in the morning; urine is then passed and the centrifugalised deposit examined. This examination should be repeated two or three times. The prostatic secretion is examined in a similar fashion after cleansing the urethra. Urethroscopic examination is a clinical procedure which should never be neglected.

From the therapeutic standpoint, Harrison believes in the value of general rather than local treatment; silver preparations applied to the affected tract destroy only surface organisms and are quite useless against those lying deeply in the urethral or cervical mucosa. The most hopeful line is the stimulation of antibody formation either by means of vaccines or by the induction of protein shock by such substances as electrargol or milk: but much work on these lines is necessary. Diathermy is also hopeful, particularly in epididymitis and prostatitis.

A combined Diluting and Staining Fluid for Differential Leucocyte Counts in the Counting Chamber.

By DANIEL NICHOLSON.

(*Journ. of Laboratory and Clinical Med.*, Vol. XII, No. 6, p. 548.)

AFTER pointing out the fallacies involved in making differential leucocyte counts by the ordinary slide method, Nicholson describes a technique whereby total and differential counts can be made in the counting chamber.

For this purpose he uses a diluent composed of 6 per cent. Giemsa's stain in 20 per cent. acetone in distilled water. Stain and acetone solution are kept in separate bottles and mixed in the requisite proportions just before use. Blood is withdrawn and diluted in the hæmocytometer pipette as usual. The red cells are rendered transparent in from 5 to 10 minutes; thereafter a drop of fluid from the pipette is placed in the counting chamber in the usual way.

It is claimed that the different types of leucocytes are readily distinguishable. Pipettes and counting chamber must be scrupulously clean and free from any trace of acid or alkali: the presence of either of these interferes seriously with staining. The mixture of Giemsa and acetone solution is unstable and must be made up fresh daily.

Labour with a Double Uterus.

WE take the following abstract of an interesting case from the *British Medical Journal*.

Vaudescal and Kerneis (*Bull. Soc. d'Obstét. et de Gynécol. de Paris*, December, 1926, p. 607) relate the case of a woman, aged 25, whose first four pregnancies terminated respectively in abortion in the fourth month, a difficult forceps delivery, and two spontaneous live births. Twin gestation was diagnosed during the ninth month of a fifth pregnancy; after delivery of the first infant at term the existence of double cervix and corpus uteri was recognized. The puerperium appeared normal, save that lactation was absent; the second fœtus was not born until forty days later, with dystocia, attributed to obstruction by the empty half of the uterus or to an intrapelvic septum. The second child died, but in the

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second puerperium the breasts secreted so freely as to permit suckling of the first infant. J. Bureau (ibid., p. 619), describes cases of premature expulsion and of retention of the decidua of the empty half of a double uterus of which the other side was pregnant. In the first case a woman, aged 25, became pregnant shortly after division of a vaginal septum for dyspareunia. During the eighth month she was admitted to hospital for abdominal pain, and there expelled the lining membrane of the non-pregnant uterine cornu; labour occurred normally one month later. The second patient, a primipara aged 23, was delivered, after section of a vaginal septum, of a live fœtus presenting by the breech. When it was decided during the puerperium, on account of pyrexia and fœtid lochia, to explore the uterine cavities, the one which had lately been gravid was found to be healthy and empty, and the other to contain a retained and infected decidua. Both these patients had amenorrhœa following conception.

The Prescribing of Spectacles.

A VERY interesting position has arisen in Great Britain with regard to the prescribing of spectacles for persons insured under the Insurance Act. In India it is safe to say that the vast majority of all spectacles worn are prescribed by opticians and not by ophthalmologists. Even in Great Britain the case is apparently similar. Yet such a procedure is not free from danger, because defective sight may be due to systemic diseases which will not be recognised by the optician. The opticians are seeking to have established a recognised legal register of opticians qualified to prescribe lenses, whilst distinguished ophthalmologists hold that such a procedure is open to grave risks. The situation is summed up in the following article in the *Lancet* for April 22nd, 1927:—

A Departmental Committee is sitting to consider the Optical Practitioners (Registration) Bill which has been read in the House of Commons for the first time and to make recommendations. This Committee will benefit by the wide range of experience possessed by its medical members, Dr. H. B. Brackenbury, Mr. E. Treacher Collins, and Dr. C. O. Hawthorne. The correspondence on this subject which has been appearing in these columns for many weeks past displays well enough the conflicting views of prescribing opticians and ophthalmic surgeons. The prescribing optician claims to be better qualified for the work of testing the refraction than the average medical man and as well qualified for it as the average ophthalmic surgeon. To ensure this high standard they propose that a register of opticians should be established which should include only those possessing special qualifications which in the future are only to be granted to those who have undergone a technical training lasting three years, and including experience at special "refraction" hospitals. At present the fee for testing allowed by those approved societies that send their members to opticians is 5*s*. and as presumably these highly trained "optometrists" will be content with this fee, it follows that the approved societies, and through them their members, will reap the benefit of the difference between 5*s*. and 21*s*. under which latter fee the ophthalmic surgeon is not willing to do this work. The opticians further maintain that the number of medical men qualified to do this particular work is insufficient for the demand which will be made if the work is given to them alone. They also point out that in the past the bulk of this work has, as a matter of fact, been done by opticians; and they regard the ophthalmic surgeon, inasmuch as he claims to do refractions for everyone, as something of an interloper.

The ophthalmic surgeon's case may be put shortly thus. The average general practitioner does not undertake this work. The ophthalmic "panel" consists only of such as have had special experience in eye work, and includes a large number of those who practise ophthalmic surgery exclusively (Mr. Adrian Caddy in his letter says "practically all," but we believe this to be an exaggeration). There is no evidence to support the contention of the opticians that the number is insufficient and there is every reason to suppose that the supply will increase with the demand. The prescribing of spectacles cannot be done with complete satisfaction except by those who have knowledge of the body as a whole—i.e., by medical men and women. The advisability or otherwise of wearing glasses is in certain cases a matter which requires considerable judgment and cannot be decided solely by reference to the amount of refractive error. Moreover it is not a matter which can safely be left to the decision of those whose interest it is to push the sale of glasses by every possible means. Diseases of the eye are frequently dependent on diseases affecting the whole body. The claim made by opticians that they are as well able to diagnose a normal fundus by the ophthalmoscope as the ophthalmic surgeon can hardly apply to the great majority of opticians at present. Those who go through the three years' course and obtain admission to the proposed opticians' register will form a limited body of men who, while nominally only concerned in the prescription and supply of glasses, are not very likely to be content with that. As they will necessarily have to diagnose many cases of disease and abnormality other than refractive errors, the tendency will be for them to occupy the position of an inferior and partially trained body of oculists.

Hardly enough attention seems to have been paid to the point of view of the insured patient. For him, the question is whether, when his eye troubles him, he would rather see a man capable of diagnosing and treating any possible cause of the trouble or a man who is admittedly capable of dealing with only one of the possible causes. He will not, we think, be much troubled by the propaganda on cigarette cards which will enable the "mere child" to arbitrate between doctor and optician. Undoubtedly what the patient wants is to see the best possible man, even if this means a rather larger fee to be paid by his society. Possibly the solution might be found in the direction of an optician given to the patient himself; in order to get the best possible advice he might be willing to pay the extra fee involved in a consultation with an ophthalmic surgeon out of his own pocket when his society declines to do this for him. In any case it is essential that the privilege of choice of oculist from among the existing panel be more effectively brought to his notice than is the case at present with many of those societies that have already adopted the scheme of the Ministry of Health with regard to ophthalmic benefit. This is the more necessary in that whereas opticians can and do advertise, ophthalmic surgeons do not. Mr. Adrian Caddy suggests that the list of names on the ophthalmic panel should be available to the public in the post offices. Certainly all practitioners on the ordinary panel ought to have it. If at the same time the body which controls the names to be included in the ophthalmic panel could be made more authoritative, the whole matter would be in the way of reaching a satisfactory basis.

Studies on the Serology of Leprosy, III, The Kahn Precipitation Reaction in Leprosy.

By ELOY V. PINEDA

and

ELISA ROXAS-PINEDA.

(*Philippine Journ. Sci.*, July 1926, p. 295.)

THE sera from 250 cases of leprosy were tested by the Kahn precipitation test; 36 were positive in some degree, 28 of whom were also clinically positive for syphilis or yaws, and treatment of 14 produced negative reactions in 12 and lessened the reaction in 2. 54 cases with lepra reaction all gave negative results, although it is in these that a positive Wassermann is most often obtained. The authors therefore conclude that the Kahn precipitation test is negative in uncomplicated cases of leprosy, even when lepra reaction is present, and so is preferable to the Wassermann test in detecting treponematous

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infections in lepers. It also has the same value as the latter test in yaws.—*Tropical Diseases Bulletin.*

The Treatment of Wassermann-Positive Cases of Leprosy by a New Oil-Soluble Mercury Preparation.

By E. MUIR, M.D.

(*Ind. Journ. Med. Res.*, Oct. 1926, p. 291.)

As a number of leprosy patients with a positive Wassermann improve rapidly on antisyphilitic treatment a combined treatment for both affections is desirable, and it appears to have been obtained in a new mercury preparation made by Dr. T. A. Henry, of the Wellcome Research Laboratories; the chemical name of this compound is 2-myristoxymercuri-3-hydroxybenzaldehyde, or for convenience "Hg. 33." It is easily soluble to the extent of 0.25 per cent. in hydnocarpus oil and is only slightly more irritating subcutaneously than the oil alone. A table is given of 30 cases with Wassermann reaction treated in Calcutta, with almost invariable improvement, but most marked in those whose Wassermann reaction became negative, although no effect had been produced on the reaction by long previous courses of hydnocarpus oil alone. Before the combined treatment, 17 showed strongly positive and 13 moderately positive reactions: after the course, 8 were still strongly and 4 moderately positive, 2 doubtful, while 16 were negative, after one course of 15 injections in 10, and 2 to 4 such courses in the other 6. Its non-toxicity and ease of administration in hydnocarpus oil render it a safe and effective remedy in Wassermann positive lepers, while the cases remaining positive after the treatment still remained so after one or two courses of novarsenobillon; this indicates that it is at least as effective as the older remedy and it has the great advantage of being much safer to use in leprosy.

Some Practical Principles of Anthelmintic Medication.

By MAURICE C. HALL.

(*Journ. Parasit.*, Sept. 1926, p. 16.)

THE essential factors in anthelmintic medication are, according to Dr. Hall, practitioner, patient, parasite, parasiticide, purgative and prophylaxis.

The *practitioner* is the key factor to all the others, with which he must be acquainted. Hall claims that the American practitioner (human or veterinary) is handicapped by a lack of suitable training. In deciding the drug and the dose to be administered, the practitioner must consider the *patient*, his age, size, sex, food, habits and general condition. In general, human patients, dogs and cats can be given a light evening meal and treated three or four hours before the morning meal, nothing being gained by a longer fast. Pigs require at least 24 hours' fasting, while ruminants need only be fasted overnight. Horses, on the other hand, require 36 hours for parasites in the large intestine, and 12—24 for parasites in the more anterior parts of the alimentary canal. The nature of the food is important. Alcohol in general is inadvisable and alcoholism is a special contraindication for carbon tetrachloride. Carbohydrates are available with drugs of this type. Fats are contraindicated (except castor-oil with chenopodium) and some, such as olive oil with chenopodium, are actually dangerous as they tend to remain in the stomach and favour absorption of the drug. A knowledge of the *parasite*, its habits and habitat are, for obvious reasons, also necessary. The *parasiticide* (poison) should be well understood and should not be used until the diagnosis is certain. Chenopodium is more effective against Ancylostoma and Ascaris while carbon tetrachloride is more effective against Necator and the ankylostomes and ascarids of the dog. Male fern destroys Fasciola but not Dicrocœlium. Tartar emetic or emetine will kill the blood flukes but not *Filaria bancrofti*. We are just entering on the stage in anthelmintic medication when data about the chemical composition and the anthelmintic value of drugs are becoming available. He considers that the now academic difference between vermicide and vermifuge should no longer be employed as it has no practical value. Contraindications depend on the patient and drug used. General contraindications are extremes of age, febrile and debilitating conditions, gastro-enteritis, gross helminthiasis, high fatty diet, and such conditions as gastric stasis or pronounced constipation. Chenopodium is irritating, depressing and constipating; carbon tetrachloride tends to produce acute yellow necrosis of the liver; beta-naphthol destroys the red cells. In these cases the contraindications are obvious. Carbon tetrachloride is safe in pregnancy while the others, with thymol, are not; but it should not be used in gross ascariasis as it tends to cause a fatal intestinal obstruction with atony of the intestine; in ascariasis accompanied by gastro-enteritis, santonin should be used. In addition to the parasiticide, the practitioner must consider the *purgative* (prompt purgation is protective). Many combinations are found to be effective in general practice, e.g., chenopodium and castor-oil, carbon tetrachloride and epsom salts, santonin and calomel, and so on. Dogs will survive lethal doses of male fern or chenopodium if given with castor-oil.

The final factor, *prophylaxis*, depends on a knowledge of the life-history—ascariasis involves "coprophagy" and a lack of sanitation; hookworm infestation means skin infection which means skin exposure with concomitant lack of sanitation; trichuriosis implies eating of improperly cooked pork: filariasis indicates attack by mosquitoes and so on.—*Tropical Diseases Bulletin.*

Studies in Filariasis.

By F. G. ROSE.

(*Trans. Roy. Soc. Trop. Med. and Hyg.*, June 17, 1926, p. 198.)

ROSE has conducted a number of experiments with the larvæ of *F. bancrofti*, and finds that the migration of the larvæ to the cutaneous blood proceeds from about 6 p.m. till 6 a.m. Larvæ in hypofonic saline are very much larger than those in hypertonic saline while similar differences are observed between larvæ in the venous and cutaneous vessels, those from the cutaneous blood at night being much larger than those from the venous blood at the same time. Those in the venous blood at midday are much larger than those in the same situation at night, while if the periodicity is reversed the larvæ in the cutaneous blood appear larger during the day than at night in the normal individual.—*Tropical Diseases Bulletin.*

Comparative Value of Sodium Hydroxide, Copper Sulphate and Fermentation in Disinfecting Human Excreta containing Eggs of Hookworms or Ascaris.

By C. W. STILES.

(*Journ. Parasit.*, Sept. 1926, p. 47.)

A 1 PER CENT. solution of caustic soda destroys hookworm eggs in excreta in 14 days in summer, 2 per cent. in 9 days, 5 per cent. in 6 days and a 0.5 per cent. in 4 weeks. Under winter conditions with a 1 per cent. solution they live for 6 weeks and with a 0.5 per cent. solution for 8 weeks. Copper sulphate may be as safe a disinfectant, but the question is still *sub judice*. 1 per cent. sulphuric acid, 1 per cent. calcium hypochlorite, fermentation and pine tar disinfectant are inferior to caustic soda. Fermentation is adequate if ample moisture is present and about 5 months time is allowed. It is suggested that so far as hookworms are concerned 1—5 per cent. caustic soda is one of the most efficient disinfectants for human excreta, and if properly treated thus, the night soil may be safely (as far as hookworm

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is concerned) used for fertilizer.—*Tropical Diseases Bulletin.*

Practical Experiences in the Diagnosis of Liver Abscess.

By P. MANSON-BAHR.

(*Journ. Trop. Med. and Hyg.*, April 1927, p. 106.)

AFTER pointing out that liver abscess may be extremely protean in its manifestations, Manson-Bahr enumerates the following points as aids to diagnosis:—

(1) Previous history and clinical appearance of patient. A history of previous dysentery or of intermittent bouts of diarrhœa is usually elicitable: the patient is commonly emaciated and presents a curious earthy pallor. Loss of appetite and a chronically furred tongue are present in most cases.

(2) *Symptoms and signs.*—Liver abscess is in the majority of cases right sided. The symptoms and signs are divisible into two groups referable (*a*) to the pressure of the enlarged organ on surrounding structures, (*b*) to the presence of pus in the liver. Of the former, pain referred to the right shoulder, (from irritation of the phrenic nerve), local œdema of the chest wall, (usually about the 6th to 8th intercostal spaces in the mid-axillary line), and impaired resonance over the base of the right lung are important, while as a result of the latter, night-sweats and a polymorphonuclear leucocytosis are frequently observed.

Differential diagnosis has to be made from typhoid, malaria, gumma of the liver, malignant disease, and less commonly hydatid cyst.

Reviews.

DENTAL MATERIA MEDICA AND THERAPEUTICS.—By Herman Prinz, A.M., D.D.S., M.D., Sc.D. Sixth Edition. St. Louis: The C. V. Mosby Co., 1926. Pp. 632, with 146 illustrations. Price, $6.00.

THE very fact that this notable volume has reached its sixth edition in the course of thirteen years shows that it is a book which is very much appreciated.

The subject-matter of the book is treated from the point of view of the pharmaco-therapeutist. Part I deals with general therapeutics. Part II deals with pharmaco-therapeutics. Part III deals with physical therapeutics. Part IV deals with local anæsthesia. There is an excellent appendix, which also covers toxicology.

The dental practitioner requires a large number of remedies which are seldom employed by the medical practitioner, unless used by him for totally different purposes. This book deals in an exhaustive manner with all the known dental remedies. The author avoids all vague information and elucidates all his points from clinical facts which have been established by pharmacologic research.

It is an excellent text-book and reference book for dental students and practitioners, and should be in every dental library. The index at the end will be very useful in finding out about any drug used in dental surgery. The printing and get up are in keeping with the reputation of its well-known publishers.

R. A.

THE TREATMENT OF CHRONIC DEAFNESS BY THE ELECTROPHONOIDE METHOD OF ZUND-BURGUET.—By George C. Cathcart, M.A., M.D. Bombay: The Oxford University Press and Constable & Co. Pp. viii plus 210, with 2 illustrations. Price, 6s. net.

MR. CATHCART'S book on the treatment of chronic deafness by the Electrophonoide method of Zünd-Burguet is the first publication of its kind one believes to be produced in England. From the results given of 100 cases actually treated by this method of auditory re-education, Mr. Cathcart proves conclusively that the treatment, though empirical, is one of the greatest value and therefore not to be neglected. The results of this series of cases seem far to surpass in success those of any other method of treating chronic deafness which we possess. The only charge—a flimsy one—that could be levelled against it is that it is not based upon any known physiological or pathological factor. Mr. Cathcart however successfully meets this by giving well known instances of age-long empirical remedies, such as quinine for malaria, which have stood the test both of time and science. The book is well arranged and interesting, and is to be welcomed as bringing to the notice of the medical profession a new and apparently highly successful method of treating one of the most tragic afflictions of man.

N. J. J.

X-RAY DIAGNOSIS.—By J. Magnus Redding, F.R.C.S. London: Cassell & Co., Ltd., 1926. Pp. 228, with 80 skiagraphic plates. Price, 21s. net.

THIS volume, written in the hope that it may prove useful to the surgeon, practitioner and post-graduate studying for the higher examinations, has many good points. Unfortunately it leaves the reader in mid-air. Its scope is too limited to be of real service to the expert radiologist or even to the post-graduate preparing for the D.M.R.E. examination; on the other hand it is too specialised and too technical for the ordinary student of medicine, for whom a much smaller and simpler presentation is needed.

The arrangement of the subject-matter and the general plan of the book are excellent, and it compares favourably with other works of its kind.

The author has wisely omitted details of apparatus and technique. The description of lesions affecting the different anatomical systems is preceded in every instance by an analysis of the appearance produced by the normal structure, in the hope that a basis for logical interpretation may be provided.

In spite of its shortcomings, it is a book which can be recommended to all interested in the latest advances in the science of radiological examination, and it is to be hoped that in a future edition the author will expand his subject to make it really a classical work.

J. A. S.

ROENTGEN INTERPRETATION.—By George W. Holmes, M.P. and Howard E. Ruggles, M.D. Third Edition, revised. London: Henry Kimpton, 1926. Pp. 326, with 226 illustrations. Price, 21s. net.

THAT this little volume should have reached its third edition is in itself proof of its utility. It professes to do little more than cover the essentials of the subject. Its short-comings in this respect to some extent, however, are made up for by the extensive bibliography at the end of each chapter. Still, within its small compass few of the subjects discussed can receive anything like adequate treatment.

On the whole it is a book more for the general practitioner and student than for the expert radiologist.

We have nothing but praise for the publishers. The reproduction of skiagrams, not always of the best quality, leaves nothing to be desired. The letterpress is clear and the general presentation of the work up to the high standard expected of a firm of their reputation.

J. A. S.

DISEASES OF WOMEN.—By H. S. Crossen, M.D., F.A.C.S. Sixth Edition. St. Louis: The C. V. Mosby Co., 1926. Pp. xxvii plus 1005, with 934 engravings including one colour plate. Price, $11.00.

Si monumentum requiris, introspice. No better motto than this can be found by the reviewer for this volume, which most exquisitely represents the teaching and methods of the Washington Medical School. Special features of this book are the most excellent illustrations, which are a lesson in themselves for both student and

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teacher, for Dr. Crossen obviously teaches and preaches *via* pathological anatomy.

In a book so well produced it is difficult to pick out one chapter which is better than another, but perhaps it may be permitted to refer particularly to those chapters dealing with cancer of the uterus and pelvic inflammation.

It might be suggested that in any future edition greater space be given to classical operations and that illustrations and descriptions thereof should be adequate: for example we should have liked to see the Watkins operation for prolapse and some of the Mayo clinic operative technique known in every theatre of the globe (many of which are referred to by Dr. Crossen as being those he uses himself) both illustrated and described, and better still criticised out of his enormous experience and follow-up system.

We feel that such additions to the volume might take the place of many of the pages devoted to gynæcological diagnosis, and would greatly enhance its value to both practitioners and specialists.

V. B. G.-A.

IMMUNITY IN SYPHILIS.—By Dr. Alan M. Chesney. London: Baillière, Tindall, and Cox, 1927. Pp. ix plus 85. Price, 11s. 6d. net.

This book, which constitutes Vol. XII of the publishers' *Medicine Monographs*, gives an admirable review of the immunological aspects of syphilis in the light of the most recent advances of our knowledge of the subject, whilst its conclusions are derived chiefly from the experimental work of the greatest authorities and research workers of the present day.

The author has dealt with his subject in so clear and so unambiguous a style that both general practitioners and syphilologists alike will find the book of very great value. Such questions as the co-existence of infection and immunity are dealt with, not as academic subjects, but as matters of practical importance.

Interesting subjects dealt with are the doubtful position with regard to the cure of patients treated at a late stage of the disease; cases of undoubted re-infection in patients in whom treatment was begun early in the course of the disease; inoculation and re-inoculation experiments directed to ascertaining the degree of immunity after a first exposure to the disease; and the opinion, quoted from Neisser 'that there is no such thing as true lasting immunity in syphilis, that is to say, an acquired immunity which persists in the absence of infection.' These, and many other matters discussed, are well worth the attention of both general practitioners and specialists.

We cordially welcome Dr. Chesney's handbook as a most interesting, ably written, and instructive contribution to a difficult subject.

DISEASES OF THE NOSE AND THROAT.—By Sir St. Clair Thomson, M.D., F.R.C.P. (Lond.), F.R.C.S. (Eng.). Third Edition. London: Cassell & Co., Ltd., 1926. Pp. xvi plus 943, with 12 colour and 12 black and white plates. Price, 45s. net.

The appearance of the third edition of Sir St. Clair Thomson's world-renowned work upon *Diseases of the Nose and Throat* is welcome: after an interval of ten years since the publication of the second edition, much has happened in this space of time and the advances of rhinolaryngology have indeed been rapid. The author is to be congratulated upon the quickness with which he has eliminated all old and obsolete procedures and brought this valuable book up to date. One is gratified to see the changes in the chapters on the accessory sinuses, the inclusion of much new matter upon the œsophagus, and the recent views on malignant disease of the larynx and its operative treatment. The book is a great improvement upon the last edition and one could not wish for anything more complete for its size.

N. J. J.

LISTER AS I KNEW HIM.—By Dr. J. R. Leeson, M.D., C.M. (Edin.), M.R.C.S., J.P. London: Baillière, Tindall and Cox, 1927. Pp. viii plus 242; with 6 illustrations on art paper. Price, 8s. 6d.

The publication of this book is exceedingly opportune, for it coincides with the celebration of the Lister centenary in London, Edinburgh and Glasgow. The book cannot compare with Sir Rickman Godlee's *Lord Lister*, for the latter is a medical classic, and the author wrote from long and intimate relationship with Lister and with full access to Lister's memoranda and documents. It is rather—as the title implies—Lister, as the author knew him in the days of Lister's prime and when the author was dresser, surgical clerk, and devotee of Lister. There is a personal charm about the book however which is perhaps less marked in Sir Rickman Godlee's work, perhaps a more intimate touch, but less of history in it.

The book is a difficult one to review, as it is so much made up of reminiscences. Its literary style is easy and makes pleasant reading. What conditions were before Lister's days it is now impossible to imagine. The author tells the story of a young countryman coming into the out-patient department of a London hospital, and stating that he was about to be married, but that his sweetheart complained of the fact that his nose was too much to one side. Could it be straightened? The septum was straightened at operation, and the patient died of septicæmia five days later. That story alone, and it is merely typical of what used to occur, is instructive in its glimpse of "hospitalism" in the old days.

Like Lord Lister himself, Dr. Leeson received his medical education in London (at St. Thomas's), and then migrated to Scotland. And his first attendance was in Lister's wards in Edinburgh. They struck him as dingy, dark, and severe; "a strange smell pervaded the building of distant carbolic acid, stale tobacco smoke, and ancient boiled beef." *But* the temperature charts beside the patients' beds showed no fever; the patients were smiling and happy, even in the dingiest surroundings; and they worshipped Lister, who, in return, never spared any pains to make a patient comfortable. W. E. Henley who was a patient of Lister's for some considerable time at Edinburgh, has left on record delightful verses which the author quotes of Lister's visits to the wards, of Mrs. Porter—the severe, prim dame of days who supervised the wards as surgical matron. Lister's rounds of the wards are well described. He was usually accompanied by a be-whiskered contingent of professors from foreign universities, with whom he sometimes conversed in their own languages. Never a smile moved him, but he always took a tremendous amount of care that each patient was as comfortable as possible, and woe betide the dresser or surgical clerk who had neglected the patient's comfort.

To-day in the Wellcome Medical Historical Museum in London may be seen Lister's original ward at Glasgow, re-created as far as it is possible to re-create the past; it is a valued relic quite as precious as the apple which Newton is said to have seen fall, now treasured at the Royal Astronomical Society; the blood-stained, riddled coat which Nelson wore at Trafalgar, preserved at Greenwich Hospital; or the original apparatus of Faraday and Cavendish, housed at the Royal Institution.

The book is of special interest in its description of Lister as a personality. The only boast which Lister is known to have made was his remark, after operating on Queen Victoria for axillary abscess, "Gentlemen, I am the only man who has ever stuck a knife into the Queen." He was a man of simple, unassuming genius; possessed of an incurable modesty; yet a man who made a tremendous impression of power and a forceful personality on all who met him. His lectures were unique, for he followed Syme in dealing with the pathology and physiology of disease, and actual patients rather than the theories of disease were the theme of his discourse. The descriptions which the author gives of Lister in the operating theatre are ones to read again and again. There would be the gallery, packed to

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suffocation. In the sacred enclosure around the operating table—a simple wooden structure with sawdust on the floor around it—were a few distinguished visitors from different continental countries. One clerk had charge of the carbolic spray, and woe betide him if it went wrong. A second had charge of the tray of instruments soaked in carbolic lotion. Lister always insisted that the tray of instruments should be covered with a towel wrung out of carbolic lotion; he could not bear that the patient should see the instruments. The patient would be brought into the theatre and laid upon the table: there would follow a discourse on the features of the case; then—usually—operation, carried out under anæsthesia carefully, with meticulous attention to detail, under the carbolic spray, and with the happiest of results. The author records how on one of these solemn occasions, when Lister entered the theatre amid the usual hush preceding his lecture and operation, an irrepressible wag in the gallery remarked, "Brethren, let us s-spray." An irrepressible titter went round the gallery benches; but Lister was equal to the occasion. He made no remark; merely lifted his eyes towards the offender and sighed; whereupon the demonstration went forward in perfect silence.

The author does well to remind us of Lister's contributions to physiology and bacteriology, for they were notable. His surgery was founded on two main principles; the doctrine of Pasteur that disease and sepsis were due to the introduction of germs from without, and a study of every factor that could make for the comfort and speedy recovery of each individual patient.

Accounts are given of Lister as Professor of Clinical Surgery at Edinburgh; a description of an operation by Lister; and of the introduction of antiseptic dressings. There are delightful reminiscences of Mrs. Porter, the matron, aged over 70, defying the assistance of artificial teeth, ruling both professors and students alike with a rod of iron, yet humorous and kindly withal, with wonderful legends behind her of service in the Crimea; she had mothered Syme at Edinburgh; she spoke her mind to Lister as his pupil, son-in-law, and successor. Finally, come accounts of Lister's contributions to surgery, his influence in Edinburgh University, and an account of his later long up-hill struggle in London against the prejudices ranged against him, prejudices which he gradually and steadily overcame, though it was largely through the re-introduction of his antiseptic methods into London from the Continent that the antiseptic method of surgery was established; to be followed by the aseptic surgery which is its modern development.

A chapter of Listerian aphorisms and precepts is a most interesting feature of the book; also a chapter of reminiscences entitled "Fifty Years After," being a mere bald summary of what Lister's teaching has wrought. Finally, a special word must be said about the illustrations. These are altogether admirable, and they do the publishers the utmost credit. There is a splendid photogravure reproduction of the head and shoulders portrait by Emery Walker (similar to that facing p. 394 of Sir Rickman Godlee's book in its third edition). There is a photograph of Lister's wards in the Royal Infirmary, Edinburgh, a scene of dinginess in which miracles were wrought: a sketch of course of the carbolic spray; a photograph of Mrs. Porter, which someone must have had the audacity to take; and a most beautiful portrait of Lister in the presidential chair of the Royal Society—a portrait which we confess we had not seen before, but which is altogether admirable, and is taken from Professor Chiene's *Looking Backwards*.

To those who "know not Lister," or at least have not read how he created modern surgery we would especially recommend this book. It is admirably written and has a personal touch of intimacy. "Any anecdotes of Lister will always be welcome from any of the fast disappearing band of pupils who followed him through his wards, and were eye-witnesses of his wonderful work during his earlier struggles," quotes the author from *Science Progress* in 1926. The author has tried to outline both the scientific and personal side of Lister's wonderful career, and his book is one which it is delightful to read.

R. K.

TEN WEEKS WITH CHINESE BANDITS.—By Harvey J. Howard, M.D., Professor of Ophthalmology, Peking Union Medical College. Australia, Sydney, Angus and Robertson, Ltd., 1927. Pp. 274. Price, 6s.

WE wondered when we opened this book why it should be sent to a medical journal for review. Then we found ourselves looking at its beautiful photographs, then the story seized our attention, and we did not lay the book down until it was finished. And as we closed it, we realised that it is eminently a book for review by a medical journal, for the medical problems of China with which it so largely deals are indeed terrible.

Dr. Howard is Professor of Ophthalmology at the great Peking Union Medical College, that splendid creation by the Rockefeller Foundation to serve the best interests of China. And in the summer of 1925 whilst on a visit to friends at Aolaimi in Manchuria, he was captured and carried off prisoner by a band of "hung hutze"—s, a band of the Black Dragon Bandits which had been terrorising the Manchurian provinces for months; whilst his friend, Major W. M. Palmer, was killed. For ten months Dr. Howard lived as a captive of the bandits. And the story of those ten months is more fascinating than any mere romance of fiction.

At first he was treated with the utmost brutality. The photographs show the author to be a man of tall and robust physique, and no one of lesser stamina could have stood all that he went through. He was at first condemned to death—the bandits having become seriously perturbed about their having killed Major Palmer, a well-known colonist in Manchuria, and of the retribution which would follow. Finally, after considerable haggling, he succeeded in bringing down the price which was to be paid for his ransom from $50,000 to $10,000 to be paid within ten days. On the tenth day, after much weary travel and very great hardships, he was again going to be shot as the ransom had not arrived, and the bandits were being slowly but surely invested by a large force of Chinese soldiery, which American push and insistence had galvanised into action. The leader of the band, Jih Pen Tzu, in common with most of his followers, however, was suffering from trachoma, which had taken a very acute turn, and Dr. Howard was asked if he could do anything. In the entire absence of all drugs and dressings all that he could do was constantly to apply fomentations, and this so relieved the patient that Dr. Howard was for a second time reprieved.

But the chase now began in earnest, for the military forces were closing in. Moving chiefly by night through forest tracks, the bandit party made for the mountains of Kirin, where they had a rendezvous with a larger band, and where they hoped that the final transactions for the release of Dr. Palmer Howard and the payment of his ransom would occur. Thanks to his efficient treatment of the bandit leader's eyes, Dr. Howard soon found himself installed as honorary physician to the band, and in competition with the two medicine men of the group. This competition had nothing bitter about it; it was a humorous interchange of pleasantries and a study of each other's methods. Surely there can have been fewer queer incidents in real life than this story of a distinguished ophthalmologist being appointed surgeon and physician to a robber band, armed only with an occasional bottle of aspirin tablets, or some tincture of iodine come across by accident, and with severe trachoma as the chief disease to be dealt with. Massage, which he introduced, proved to be very popular for ankylosed limbs and old gunshot wounds. Jih Pen Tzu was so grateful for the relief afforded to his eyes that he took Dr. Howard off the slave-junk in which he had been immured into his own tent, and there began a queer friendship and companionship between the two men, each of whom found qualities to respect in the other.

At the rendezvous in the mountains news was bad, and the soldiers for once were in earnest. Quarrels between

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the two bands occurred and finally in the midst of a pitched battle near a farmhouse Dr. Howard was rescued. Immediately upon his rescue several distinguished officers claimed that each of them was responsible for Dr. Howard's rescue, and he was put to considerable difficulty in writing "chits" for his rescuers. In fact he gives evidence to show that the pitched battle in which he was rescued was a pre-arranged affair; the rifles captured were those on a led horse, and did not belong to the bandits who were supposed to have been killed. Despite the actual firing, also, the killed and wounded were not in evidence. As a story of adventure Dr. Howard's book is an absolutely fascinating one. The bandit's life, we gather,—like the policeman's—is not a happy one. There are days when everything goes well; the sun is shining, the farmer upon whom the band is billeted for the time being is compelled to give of his best by way of provisions and lodging, there is plenty of opium for the pipe, the soldiers are pacific, there is a steadily growing balance in the bank at some central town with which to face the winter. But such a picture is exceptional. The life in general is one of extreme hardship, ever recurrent danger, and many of the recruits are unwilling volunteers. They are a strange mixture, men of education with the scum of Manchuria; some of them quite likeable—a strange mixture of happy-go-lucky with cruelty, greed, and yet comradeship.

Dr. Howard's book is of interest from two points of view. First, his unvarnished account of the condition of things as they are—or were—in China. They are probably worse by now. Not until some Chinese Mussolini arises does there appear to be a chance of peace and order for that unhappy country. Secondly, from the medical point of view. Of all the diseases of China trachoma appears to be one of the most terrible; it is probably responsible for more than five million fresh cases a year. Further, the book emphasises in no uncertain way the tremendous importance of opium in the country. The bandits had only two luxuries, after-supper conversation, and the opium pipe. And the latter they resorted to in excess: there is a description of the tremendous system of evasion of the regulations, of farmers in league with both troops and bandits cultivating opium fields, of the large sums of money spent upon opium by individuals. Dr. Howard is definitely of opinion from a first hand acquaintance with the problem that opium is one of the greatest curses of China. Eaten in moderation, it may not be a curse; but smoked to excess—as these bandits smoked it every night—it saps morale entirely and reduces the man to a wreck dependent upon his daily dose.

The book is a fascinating one. We found that we were unable to lay it down until we had read it from cover to cover. And—as with all real life—it is more interesting than fiction.

ÆSCULAPIUS ARMAQUE.—By Major M. B. H. Ritchie, D.S.O., R.A.M.C. London: John Bale, Sons and Danielsson. Pp. 112. Price, 5s.

THIS book consists of reprints of a series of articles contributed, by the author, to the *Journal of the Royal Army Medical Corps*, during a tour of service in Malta and Turkey, in 1923–25, and deals with the cardinal problems of military medicine and hygiene. It is dedicated to the "that prince of good fellows, the British soldier," and a happier dedication could not have been thought of. We would commend Major Ritchie's book for study, not only to administrative military medical officers—who will find in its candid chapters much that will afford food for reflection; but also to all officers in military medical employment, and especially to the military medical officer in civil employment who may at any time be recalled to military duty.

Essentially the author's main thesis is the absolute necessity for autonomy of the military medical services. Centuries ago it was realised that doctors and chaplains were necessary to an army, but their duties were ill defined, and their organisation entirely casual. With the Crimea, the necessity for an official military medical service, trained in peace time and organised for war, became apparent; and the R. A. M. C. and kindred services entered the Great War in a state of efficiency quite equal to that of the fighting units.

On the whole, it may be said that the system did not break down. There were miracles accomplished—of organisation in France and Europe, of improvisation in Mesopotamia and the Eastern theatres of war. Thus on pp. 19 and 20 of the book the author contrasts the military medical organisation as it was when it entered the war with the actual organisation which finally existed in France.

Yet the cardinal weakness of the whole situation, and one which still remains so, is that the medical services are not organised as an independent autonomous organisation. They must get their equipment from half a dozen different departments; they are in touch with all; serving under different authorities, but in a general sense subordinate. And such subordination means inefficiency; the man who can best run a field ambulance is frequently the man who is the best beggar; who can get round other departments, unravel his way through tangles of red tape, improvise, or even purloin.

And in the next war there will probably be no "non-combatants" from the point of view of risk; for the non-combatant services of an army are to-day perhaps as freely exposed to risk as the fighting troops, whilst the entire civilian population of a country may be exposed to ruthless attacks from the air. The necessity, therefore, as the author pleads, for a long view and for assessing in peace time what organisation will be required in the next war, is very great.

Even in civil life to-day the doctor is too much the "adviser," and too little the executive officer. "Eventually the profession must be prepared to cross the bridge from advisory to executive duties." One does not employ a trained chauffeur to stand on the footboard and instruct a novice how to drive; one requires him at the wheel. And in his first chapter, "Mars et Hygilia," there is a thoughtful discussion of the whole relationship of medicine and hygiene to military conditions. The nursery of military sanitation in the British Army was in India, where, although to quote Sir Victor Horsley it was half crippled by "financial terrorism in time of peace," it achieved miracles. One has only to compare the death-rates of to-day in the British Army in India from such diseases as enteric fever, liver abscess, venereal disease and the like with the figures for the past to realise what has been done, and that under most difficult conditions.

In "Sententiæ vagæ" the author sums up the chief experiences in France in matters of administration. In many ways the French medical equipment was better than ours; their hospital tents were notably superior, lighter, more airy, and of a better pattern; their mobile sterilising lorries, laundry lorries, motor kitchens, and the "auto-chir"—a mobile surgical unit of 200 beds—were things which we did not possess at the beginning of hostilities, and which we had to improvise. But, as with all British arms throughout the war, we got results which no nation could surpass; we "delivered the goods." A special difficulty was the water-tight partition between the medical services in France and those in Great Britain; in the long run the home surgeon was sent on a "joy-ride" round the general hospitals in France to see for himself what was going on. A still greater difficulty was the inordinate time which elapsed in many instances before men who had been sent to Great Britain were returned to the front line; towards the close of hostilities this had been countered to some extent by the establishment of convalescent camps in the neighbourhood of the Army Corps in France.

Chapter 3 deals with the training of R. A. M. C. officers for war. The professional side of a military medical officer's training must needs come first. Without it, and without the refresher courses, he "ceases to be a doctor." But the author is insistent upon the necessity for the study of war problems by military medical officers, and would have them admitted to the Staff College. New conceptions frequently emanate not from the men at headquarters who are too often the slaves of

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Toxaemias of Pregnancy

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A lowered resistance, often accentuated by the modified shock of parturition, makes PUERPERAL SEPSIS only too simple a matter in many cases, in spite of faultless obstetric technique.

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Annual Report of the Chief Medical Officer of the Ministry of Health for the year 1924, p. 115.

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routine, but from men at the periphery with the power of imagination. "In a few years from now we may be as far removed from the principles and methods of the late war as we were from those of the Crimea when we mobilised in 1914..... The medical man, if he is to keep abreast of his profession, must be a student all his life; in addition, the medical man in the Army, if he is to keep abreast of his duties in war, must study administration all his service."

In chapter 4, on "bacteriology in the next war," the author pleads for a great extension of laboratory facilities. Every field ambulance should have a microscope, and in tropical areas bacteriological facilities especially must be provided.

"At the close of the Great War" writes Major Ritchie "the question arose whether the medical success was due to the system of army organisation employed (similar to the present), or in spite of it. The general impression was that success came not from the system, but *in spite of it*. Daily, hourly, the system was honoured in the breach. Co-operation (as opposed to obstructionism) brought success."

The later chapters in the book are devoted to rather more general matters. Malaria is the biggest foe of the British Army, both in peace and war. Would it not be possible in the tropics to move regiments from malarious areas to healthy ones, at least during the malaria season? The British soldier is expensive both to create and to maintain; once he is saturated with malaria he is of no value as a fighting individual.

Medical attendance on military families has always been a bugbear in the military medical services and this the author candidly recognises. He suggests that instead, families should be entitled to call in the medical officer whom they prefer, and that a system of small fees should be instituted in place of a uniform allowance.

Chapter 10 deals with the need for a vigorous forward policy in military hygiene. At present the sanitary services are too much hewers of wood and drawers of water. Partial success also means partial failure, and that is the present position. Finally, and as a natural corollary to the various subjects dealt with by the author, he comes to the obvious necessity for a closer association of men with ideas, for the need for an annual R. A. M. C. Conference, and pleads for support for the newly formed R. A. M. C. Association.

Major Ritchie's book is not superficial, despite its small size and low price. It affords many problems for reflection, whilst we must congratulate him on his clear and candid style. He has no axe to grind save that of efficiency. We trust that the book will have a wide circulation amongst medical officers of all the military services.

R. K.

THE ANOPHELINE LARVÆ OF INDIA, CEYLON AND MALAYA.—By C. Strickland, M.A., B.C. (Cantab.), and K. L. Chaudhury, M.B., D.P.H. (Cal.). Calcutta: Messrs. Thacker, Spink & Co., 1927. Pp. 67. Price, Rs. 4-8.

OUR knowledge of the larvæ of Anopheline mosquitoes has very much advanced during recent years but the information is scattered over a large number of publications which are often not available to the average field worker. The need of a small book giving brief but up-to-date information about the larvæ of Indian Anophelines has been felt by all, and this book goes a long way to meet this much felt demand. The first part of the book deals with the collection and rearing of Anopheline larvæ and contains very useful information for the field-worker engaged in mosquito-survey in a tropical country. In the second part, "the Key," the authors have tabulated the important characters of the larvæ so far as they are known to date, giving very useful illustrations for each species. The words "long," "short" and "very short" used so frequently in the key for the lengths of the various hairs on the head are apt to confuse a beginner who is not familiar with their normal lengths in the different species. It would be better if in the second edition of this valuable book the authors would give instead the comparative measurements of these hairs in the same species. As noted by the authors themselves there are points in the illustrations which are liable to convey a wrong impression (e.g., in Fig. B., Plate II, p. 27, not only are posterior hairs wrongly represented but the *antennal hair* too is shown plumose when in reality it is simple as in other treehole breeders), and it is hoped that these necessary corrections will also be looked into in future editions. The authors are to be congratulated on their effort, as this is the first and the only book giving in brief the characters of all the Anopheline larvæ occurring in the East.* If a simple "so-called" dichotomus synoptic table had been prefixed to the "Key" the book would have been, however, more welcome to a beginner. But as it is it will prove very valuable to a person who is used to working on Anopheline larvæ as it brings together very conveniently the important characters of closely allied species.

J. M. PURI.

THE DE LAMAR LECTURES. 1925-26. THE JOHNS HOPKINS UNIVERSITY OF HYGIENE AND PUBLIC HEALTH.—By David Marine and others. Baltimore: Williams and Wilkins Co. English Agents, Messrs. Baillière, Tindall & Cox, London. Pp. 220 with 21 text figures. Price, 22s. 6d. net.

THE purpose of these lectures is stated in the foreword. They are "a series of lectures on personal and public hygiene arranged each session by the School of Hygiene and Public Health of the Johns Hopkins University. The object of these lectures is to bring before the public the general facts and points of view of modern hygiene, with the hope that in this way the School may serve as a centre for the distribution of useful knowledge in all matters pertaining to sanitation and preventive medicine."

The lectures were instituted in 1920 and have hitherto been published in the *Johns Hopkins University Journal of Hygiene*.

In the present instance however the lectures delivered in 1925-26 have been collected together in an exceedingly well printed and well bound volume. Thirteen lectures are included and present a wide range of subjects.

The prevention of goitre, the ætiology of pellagra, heliotherapy in the treatment of tuberculosis, industrial toxicology, hookworm surveys, housing and public health, body building and longevity, constitutional types in disease, and motor vehicle accident prevention, are the subjects of these essays, while last but not least is a lecture on William Farr by Sir George Newsholme. The list of subjects indicates the diversity of matter dealt with, and as each subject is treated by one who has made it a special study, it is evident that the book is a valuable summary of up-to-date knowledge and opinion on many things. It is natural that descriptions and discussions should be mainly of things American, but the world is getting so cosmopolitan now that differences in modes of life and outlook are not nearly so great as they used to be. It is interesting for instance to read that the relation of the family physician in the rural parts of the United States has largely changed in recent years. The physician of the family as a wise counsellor and friend has gradually disappeared. The swift ubiquitous and cheap motor car (or automobile rather) has led to the creation of "doctor firms" in a central spot within striking distance of many rural towns and villages. We suppose the same process must be going on in England and Scotland, though we have not seen any attention drawn to the fact.

It is impossible to summarise the articles, which themselves are up-to-date summaries of the subject

*The publication of Knowles and Senior-White's "Malaria, its investigation and control, with special reference to Indian conditions"—including its Appendix III—Key to the mature Anopheline larvæ of the Indian sub-region, preceded the publication of the book under review.—EDITOR, *I. M. G.*

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matter, looked at through American eyes. In the first lecture Dr. David Marine goes whole-heartedly for the prevention of endemic goitre by wide-spread iodine administration.

The lecture on industrial toxicology reviews all the latest work on lead poisoning and draws special attention to the dangers of tetra-ethyl lead, a volatile compound used in the enrichment of petrol and gasoline. A new disease has evolved during the last two years producing necrosis of the type of the old "phossy" jaw. The disease is found in employees in radiolite watch works, and is attributed to alpha ray emanations and zinc sulphide. Many of the industrial poisons of the present day are volatile members of the benzene group and a good description is given of these and of their effects. The fact that many health appointments in the States are political rewards still acts in many places as a distinct deterrent to health progress and to continuity of policy.

Hookworm disease is a large and difficult problem in America and Dr. Smillie gives an excellent resumé of the present position there. Light infection produces few bad effects either in the child or the adult, and intensive campaigns should be directed to the areas of heavy infestation: 100 hookworms produce definite mental and physical retardation in the growing child, 1 to 25 worms produce no measurable symptoms. Dr. Smillie places great stress on the type of soil as influencing the character of the people.

Dr. Goldberger states the evidence for and against the various theories of the causation of pellagra and finishes up strongly in favour of pellagra being a deficiency disease caused by the absence of some p—p factor (pellagra preventing) contained in yeast extract and lean beef.

Dr. Stockard, in an interesting chapter on constitution and types in relation to disease, sums up the human race broadly into old or sedentary races residing near the coast (the linear or high thyroid type), and mid-continental people far removed from the sea and the source of iodine (with more rounded heads and the physiologically low thyroid or lateral type). American phraseology has several features of its own and some sentences have to be read twice to get at their meaning. How many of our readers will realise at once what "up-cases of tuberculosis" are?

Perhaps it was a merely racial bias which made the reading of the chapter on William Farr by Sir George Newsholme the most enjoyable in the book. Few of us ourselves realise fully the part played by Farr in laying the foundation of public health administration.

"It was by Farr's life work that vital statistics in England assumed the supremely important rôle in the promotion of public health reform, and England set an example to many other countries by initiating means for measuring the chief events of life, for ascertaining their local incidence, and thus enabling action to be taken on accurately ascertained facts." The lecture is an admirable exposition of the meaning and importance of Farr's life and work.

A word about the get up of the book. The publishers introduce a novel feature by giving at the end a list of all their workers responsible for the printing and production. The motto of the firm *sans tache* might suitably (or unsuitably) be copied by some publishing firms of India.

A. D. S.

Annual Report.

ANNUAL REPORT OF THE DIRECTOR OF PUBLIC HEALTH, UNITED PROVINCES, FOR THE YEAR 1925. BY LIEUT.-COL. C. L. DUNN, D.P.H., I.M.S., ALLAHABAD, SUPDT., GOVT. PRINTING, U. P. (PRICE NOT STATED).

THE population on which this report is based numbered 45,375,787; with a birth-rate of 32.73; death-rate 24.78; and infantile mortality-rate of 175.51. Births for the whole Province exceeded deaths by 7.95 per mille of the population, the excess being most marked in municipalities—probably owing to better registration. High death-rates were recorded by the municipalities of Khurja and Sikandrabad, owing to plague, whilst cholera was also prevalent in the latter area. In Kosi and Marehra in the "notified areas" plague was also the cause of a high death-rate, and in the former area small-pox. The highest death-rate for the Provinces, 2.46, was recorded in May, and the lowest rate, 1.67, in July. A table given shows that the infantile mortality has dropped steadily from 255 per mille in 1901–1910 to 175 in 1925. Tetanus neonatorum accounted for 1,154 deaths, of which 738 were verified by inspecting medical officers as having been due to this disease. "Malaria," tetanus, convulsions, malnutrition, and "other causes" are the chief factors apparently in the infant mortality in the Provinces; but such diagnoses are largely guess-work. As usual (possibly owing to defective registration) infantile mortality is returned as being appreciably lower in rural tracts than in urban areas. August was the season of highest infant mortality, and February that of the lowest incidence; the figures being 40,615 and 17,768 deaths respectively for the two months. An excess of still-births was recorded from Gorakhpur, viz., 3,054 during the year, the next highest incidence being recorded by Azamgarh, with 938 still-births during the year; the discrepancy is obvious, and enquiries are being made. An exceedingly interesting table gives the results of the issue of a questionnaire into the chief causes of infant mortality. The answers are much as might have been expected: untrained *dais* head the list, and especially their forcible manipulations of the mother in labour; syphilis and venereal diseases come a good second; "early marriage, early child-birth, and untrained *dais;* poverty, ignorance of the expectant mothers, and unhygienic surroundings" is the terse and convincing summary supplied by Jhansi district: difficult labour, osteomalacia, prolonged labour, and overcrowding in homes, constitute the chief residual factors. There is much food for thought in this table, which is approximately representative of all-India.

In all 1,063,983 entries of vital statistics were checked by the vaccination staff during the year. The local authorities also tested in all 242,485 entries. Colonel Dunn summarises the position by saying that "it is recognised that the registration of births and deaths in rural areas by the present agency, the village chaukidar, is defective. Any of the alternative schemes proposed, if adopted, would have meant a high cost to Government; therefore the proposals for introducing a better system have been dropped by Government for the present." Statistical returns were received very late in the year from eight districts.

Of the chief diseases during the year *cholera* was not important. The total number of deaths was 7,653, with an incidence of 0.17 per mille, as against 1.48 for the previous year. In 20 districts a special anti-cholera scheme is in force, as against 28 districts in which there is none. In Garhwal district the civil surgeon reported that had it not been for the efficient work of the special anti-cholera staff, the sporadic 75 cases which occurred would probably have flared up into an epidemic. In districts where there is no special anti-cholera staff delay in reporting the first cases is often responsible for epidemics. A special enquiry into cholera in the United Provinces is being carried out under a grant from the Indian Research Fund Association.

Small-pox showed an increased incidence during the year, with a rate of 0.21 per mille. There are no regular small-pox hospitals in the province, but infectious diseases hospitals exist at Muttra, Ajodhya, Hardwar and Manora. "The state of affairs can only be described as deplorable" writes Colonel Dunn, "but no advance can be expected until the segregation of patients suffering from small-pox in suitable infectious diseases' hospitals is made compulsory, when considered essential by medical officers of health. Strict compliance with the Vaccination Acts and deterrent punishments for breach of its

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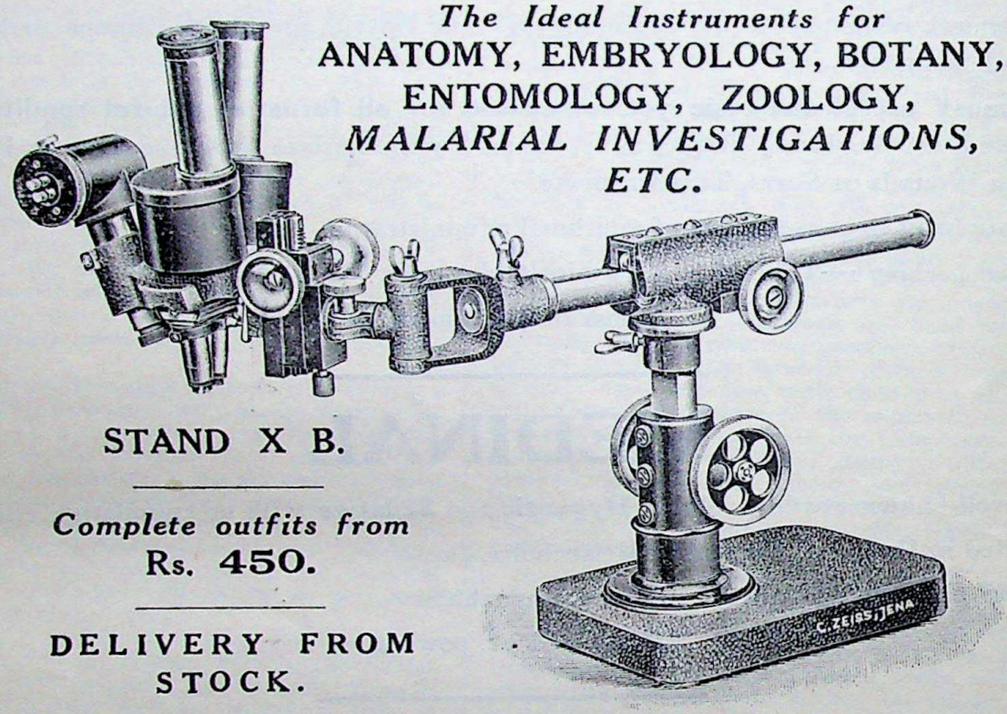

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provisions are also essential. I also consider that the time has come for the extension of the Vaccination Act to rural areas."

Plague was responsible for 49,091 deaths, a rate of 1.08 per mille. Out of 90 towns, 42 were affected.

Fevers accounted for a provincial death-rate of 19.30 per mille, a marked reduction on the previous quinquennial mean of 23.79. A table published in the report shows that in death returns from unverified agencies it would appear that deaths from dysentery, kala-azar, and pneumonia are less than the actuals, whilst deaths from small-pox, plague, relapsing fever and malaria are considerably greater than is actually the case—the diagnosis in these cases being in error. The death-rate from fevers is markedly greater in the rural areas—19.51 per mille—than in urban areas—16.33 per mille. There was no epidemic of relapsing fever during the year, but sporadic cases were reported from Naini Tal and 13 other districts. The Local Government made an annual contribution of Rs. 3,000 towards the expenses of the Kala-azar Commission under the Indian Research Fund Association. Dr. A. Sousa, Assistant Director of Public Health, made an enquiry into the incidence of tuberculosis in Allahabad city and came to the conclusion that this disease was responsible for about 19 per cent. of the total mortality.

Dysentery and Diarrhœa are notable features of the death-rate, accounting for an incidence of 0.25 per mille. Garhwal, Almora, Dehra Dun and Benares all returned high rates.

Respiratory diseases were responsible for a mortality of 0.58 per mille, and April is recorded as being the month of highest incidence. Hamirpur and Lucknow reported the highest returns. Here the urban mortality —6.50—is very markedly in excess of the rural mortality —0.16; but in rural areas pneumonia, etc., are frequently returned as deaths from "fever." Snakes and wild beasts were responsible for 4,822 deaths, and hydrophobia for 331.

Improvements to many of the municipal water-supplies during the year are noted, the largest single item of expenditure being Rs. 34,077 expended on improvements to the Jhansi water-supply. A notable event of the year was the grant by the Legislative Council of one lakh of rupees towards the cost of building a new Provincial Hygiene Institute. Eight candidates appeared for Part I of the D.P.H. examination, of whom 7 were successful. The classes for sanitary inspectors were held between October and February, and at the terminal examination 24 out of 26 candidates were successful.

Major J. A. S. Phillips, I.M.S. was in charge of the Malaria Branch in the Provinces during the year. Two classes in training were held at Banbassa and were attended by 18 officers; practically all the district and municipal officers of health in the Provinces have now been specially trained in anti-malaria work. The chief activities of the department were in connection with the Sarda canal scheme; hitherto the drains in the coolie lines have been kutcha, but is hoped now to make them permanent. The accumulation of water in the bed of the canal at its head end was a feature of the year; here the canal banks have been completed, and this cuts off the natural drainage beyond the left bank of the canal. In this area fairly extensive measures had to be taken. Quinine prophylaxis on two consecutive days a week was carried out during the malaria season, and the results in diminution of malaria in the labour force appear to have been very good. The influx of large new gangs of coolies in the middle of October, however, sent the malaria-rate up. As a larvicide a mixture of 1 per cent. castor oil in crude oil was found to be better and cheaper than the commercial preparation "Empranin."

An account of the provincial organisation against plague follows, dealing with the different districts in turn. Under a grant from the Indian Research Fund Association a special enquiry has been in progress as to the responsibility of the different species of rat fleas in the distribution of plague, Dr. B. P. Mital being in charge. In all 181,555 fleas were collected from every district and town in the United Provinces, and examined. It was found that *Xenopsylla cheopis* showed very great local and seasonal variation in prevalence, and results are not easy to interpret. In Jhansi where plague was absent *Xenopsylla cheopis* was present in smaller numbers than elsewhere in the province, and in Gorakhpur, where plague is always prevalent, its incidence was high. On the other hand, however, *Xenopsylla cheopis* constituted 86 per cent. of the flea population in Kumaon, where plague is entirely absent. The enquiry is being continued.

Dr. Khalil-ul Rahman was in charge of the Hygiene Publicity Bureau, which was opened on March 1st, 1925, until June, when he was transferred, and succeeded by Dr. Abdul Hasib Qureshi. The work of this department has been very successful, and in all no less than 16,924 lectures were delivered on health matters by the public health staff during the year. There were 40 sets of lantern equipment available at the end of the year. There was a widespread distribution of posters, booklets, and pamphlets. The Indian Red Cross Society gave a grant of Rs. 12,000 towards this work during the year.

The District Health Scheme was in operation in five districts in the province in March 1925. In June it was extended to four more districts, and in November to six further districts. The District Boards concerned have reported very favourably on the scheme, although in the absence of men holding a D.P.H. qualification, M.B., B.S. graduates of Lucknow University have been temporarily employed. The staff in this scheme in each district exists primarily for the immediate notification of epidemic disease and for immediate local measures against its spread, and it is under the direct supervision of the district magistrate and the district medical officer of health. Conservancy and general public health work is carried on in villages, and general medical relief afforded. Schools are also inspected, and entries of vital statistics verified.

The total income of the 48 District Boards in the United Provinces is over Rs. 167 lakhs, whilst their expenditure on public health purposes is just over 5½ lakhs, of which 3 lakhs is compulsorily expended on vaccination under Government rules. The amount voluntarily spent on other public health measures is therefore only about 2½ lakhs. Including vaccination, the District Boards spent 3.29 per cent. of their total income on public health measures, as against a corresponding figure of 42 per cent. expended by municipalities. The discrepancy, as Colonel Dunn notes, is tremendous, and not until the District Boards are ready to face expenditure on public health can improvement be expected: the tendency to look constantly for financial help to the Local Government means the denial of all local responsibility and an avoidance of the issues.

Mr. P. S. MacMahon, M.Sc., was Public Analyst during the year, and Dr. B. M. Gupta, M.Sc., Ph.D., acted for him whilst he was on leave. In all 504 samples of foodstuffs were analysed during the year and a considerable percentage of adulteration was found. One hundred and eleven persons were prosecuted, but Colonel Dunn reports that only too often the fines inflicted are of such a trivial character that they tend to encourage rather than to discourage adulteration. A total of only Rs. 1,932 was realised in fines as the result of these prosecutions, whereas the law permits of a fine of Rs. 100 for a first offence, and Rs. 500 for a second or subsequent offence.

The Child Welfare and Maternity centres were active during the year at Allahabad, Bareilly, Dehra Dun, Cawnpore, Jhansi, Lucknow, Meerut, Gonda, Ghazipur, Pilbhit, Agra, and Muttra. The scheme for training a superior class of midwife at the Lady Dufferin and women's hospitals in the Provinces is making steady progress and 48 such midwives were under training during the year; but Colonel Dunn notes the reluctance of Indian women of good social class to come forward for such training. National Baby Week was held in 38 centres during the year, and a novelty in this connection was the award of a special prize—containing a midwife's outfit—to those certified midwives who had attended more than 20 confinements during the year.

The various fairs held during the year in different parts of the Provinces returned an almost clean bill of health, whilst the sanitation of the Indian National

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Congress Camp at Cawnpore was also well looked after. During the year 1,872 schools and 67,582 scholars were inspected, and special circulars issued drawing attention to the necessity for such inspections. Dr. A. Sousa, D.P.H., one of the provincial service Assistant Directors of Public Health, was deputed to attend the international tour of medical officers of health under the auspices of the League of Nations held in Japan. Major J. A. Sinton, V.C., I.M.S., visited the Provinces during the year with a view to reporting on their malaria problems. A conference of Assistant Directors of Public Health and civil surgeons and municipal medical officers of health was held at Naini Tal in September, when the many different aspects of public health in the Provinces were discussed. The special Health Week held at Benares was organised by Dr. Har Govind Dayal Mathur, D.P.H., and a brief account of the arrangements made is given, to serve as a model for such Health Weeks. The Epidemiology and Hygiene Publicity Departments having been made permanent during the year; the office cadre of these and of the office of the Director of Public Health were amalgamated.

Colonel Dunn is to be congratulated on his record of a year of sound progress; of cholera, plague, and relapsing fever held in check; of enquiries into several special public health problems of the United Provinces; but his notes with regard to small-pox are similar to those of many other provincial Directors of Public Health. Out of consideration for the small minority who believe that they are conscientious objectors, rules are relaxed and the extension and enforcement of vaccination not agreed to. The results of such a policy in the United Kingdom have become clear within the past decade: small-pox—a disease almost unknown there in previous decades—is now a definite cause of mortality. In India, on a much bigger scale, similar results are bound to follow.

Correspondence.

THE ROSS-TO-MANSON LETTERS OF 1895—1899; MISSING PORTIONS OF TWO IMPORTANT LETTERS.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—In my *Memoirs* (Murray, 1923), in which I gave considerable extracts from the correspondence between Sir Patrick Manson and myself while I was conducting my researches on malaria and mosquitoes in India between 1895 and 1899, I was obliged to omit passages from two of the most important letters of the series, namely, those of the 28th June and the 6th July, 1898, because these passages were missing from among the originals of the letters lent to me years ago by Manson for the purpose of having full typewritten copies made of them. Last October (1926), however, Dr. P. Manson-Bahr informed me that he had found the missing portions of the letters among Manson's papers and kindly sent them to me for copying and return—so that the copies of all my letters to Manson are now complete.

I think that students of tropical medicine will like to see the passages mentioned—they are referred to on pages 294 and 298 of my *Memoirs*—because they deal with perhaps the most dramatic moment of the investigation.

Up to the middle of June 1898, I had worked out and established by careful "differential experiments" only the initial stages of the infection of "grey mosquitoes" (*Culex fatigans*) from birds containing *Proteosoma* (*Plasmodium relictum*), and we could not imagine how the parasites were able to return from the mosquitoes into healthy birds. This was obviously the most important point of all, because the mode of infection of the most widespread of all tropical diseases depended upon it. Manson and I had thought of several methods by which Nature might possibly complete the cycle, but nothing so wonderful as the method revealed in my letters of the 22nd June, the 28th June, the 6th July and the 9th July, 1898. In the first of these letters I described how the "proteosoma-coccidia" (my tentative name for the zygotes) produced thousands of "germinal threads" or "germinal rods" (tentative names for the sporozoids, or protospores as I prefer to call them), which escaped into the insect's body cavity. In the next letter (the first three paragraphs of which were missing and are added below) I described these "rods" and traced them into the insect's thorax. The third letter describes the desperate and (I remember) almost agonizing attempt (in Calcutta in July!) to find out what became of the rods—a question upon which depended the whole epidemiology of malaria. Here the second missing passage appended below gives the climax of the drama, the finding of the rods in the insect's salivary gland. The inference was obvious and the experimental proof was given in my letter of the 9th July—by the infection of healthy birds by the bites of infected mosquitoes. This was, I understand, the first time that an alternate generation (or rather, metaxeny) had ever been discovered for any protozoal parasite.

Missing Part of the Letter from Ross to Manson, dated 28th June, 1898 and found by Dr. Manson-Bahr amongst Manson's Papers in October 1926. See my "Memoirs" Page 294, Signed R. Ross, 6th May, 1927.

CALCUTTA, *28th June*, 1898.

DEAR DR. MANSON,—I despatched some copies of my report to you by this mail with one for Sir J. Fayrer. Will you oblige me greatly by sending it on to him? I don't know his address, but will write to him as well.

I fear much I shan't be able to send you good second-day specimens as my infected birds are so much better that they don't yield good crops any longer; but will try to-morrow.

The bulk of the copies of my report* are not sewn even yet and will never reach the Secretary of State, through the Government of India, in time for the B. M. A. Meeting. The only thing to be done then is for you to send him one of the copies I have despatched to you with Leslie's letter, and ask his permission to publish. He is sure to give it straight off.

Another advance has been made. (Follow on as in Ross' *Memoirs*, page 294).

Missing Part of the Letter from Ross to Manson, dated 6th July, 1898. See my "Memoirs," Page 298, Signed R. Ross, 6th May, 1927.

(Spending hours over) each, until I was blind and half-silly with fatigue. The object was to find if possible a place or structure where the rods accumulate; or to discover some further development in them. Nothing.

On the 4th, however, after pulling out the head by its roots (œsophagus, etc.), from the thorax, some delicate structure dropped out of the cervical aperture of the latter. This proved to be a long branching gland of some sort, looking like a coil of large intestine, and consisting of a long duct with closely packed refractive cells attached to it. I noticed at once that the rods were swarming here and were even *pouring out* from somewhere in streams. Suddenly to my amazement, it was seen that many of the cells of this gland *contained the germinal rods of proteosoma-coccidia within them.* Looking further, the cells of one whole lobe of the gland were simply packed with them, and on bursting the cells the rods poured out of them just as they pour out of the original coccidia.

(Diagram here.)

Given on Page 298 of the *Memoirs.*

The rods were quite unmistakable, having the tapering flattened and vacuolated structure peculiar to them.

* *Report on the Cultivation of Proteosoma, Labbé, in Grey Mosquitoes:* Government Printing, Calcutta; dated 21st May, 1898, but not officially published until October. As this extract shows, advanced copies of the Report had been sent to Manson before the 28th June, 1898.—*R. Ross.*

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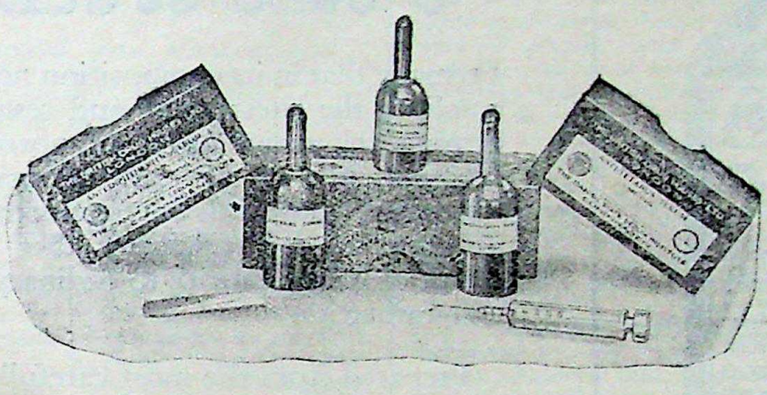

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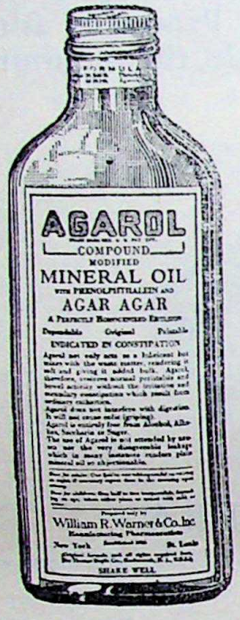

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They are identified at once and no structures like them exist in the normal mosquito. Here they were in the cells of the gland. The cells were not coccidia. They are only 25 μ in diameter, have a very thin outline and contain a perfectly clear fluid, without granulations or oil-drops such as the coccidia possess. The rods lay within them quite irregularly and motionless except for Brownian movement. In one lobe almost every cell contained numbers of rods; in other lobes only one or two cells contained them. By the attachment of the cells to the central duct, it seemed quite easy for the rods to pass on occasion from the former into the latter.

Now what was this gland? Will you believe it, I examined two whole mosquitoes without finding it again? What with the scales, the debris of muscles, etc., I could not come upon it. A third mosquito gave the same result, until I opened the *head* itself. There was the gland *attached by its duct which led straight into the structures somewhere between the eyes.* The cells were again packed with germinal rods. I have found the gland now altogether in seven mosquitoes: (follow on as on page 299 of the *Memoirs*).—Yours, etc.,

RONALD ROSS, K.C.B., K.C.M.G., F.R.S.

THE ROSS INSTITUTE FOR TROPICAL DISEASES,
PUTNEY HEATH, LONDON, S. W. 15.
12th May, 1927.

AMINOSTIBUREA IN KALA-AZAR.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—I have been testing the efficacy in the treatment of kala-azar of a number of pentavalent compounds of antimony; amongst these is Aminostiburea. A preliminary report on the results of treatment in the first seven cases appeared about 18 months ago in your journal (Dec. 1925). I have now used this compound in 52 cases of kala-azar, but as there has been some delay in getting into touch with a number of the patients, I have been unable to prepare the final report on this series before proceeding on leave. I have found this compound particularly valuable in "resistant" cases and on the whole my recent experience has indicated that the compound is more valuable in the treatment of kala-azar than my first report suggested.

I have had a number of enquiries from various medical men as to my opinion of the efficacy of this compound; as my report cannot now appear for at least 6 months, it will perhaps interest your readers if I quote from my book on kala-azar, which will be issued shortly, a short summary of my experience with this compound.

"The writer has now treated 52 patients with this compound. There were two deaths in this series, one patient developing pneumococcal meningitis and dying within 36 hours of the onset of symptoms, and two very resistant cases which did not respond to treatment. The mean total dose of the series was 2.4 grammes, which is equivalent to a dose of 3.35 grammes per 100 lbs. weight of patient, and the mean of the number of injections given to each patient was 12.06. All the patients were discharged after a negative spleen or liver puncture culture; no relapses have been reported and 35 of them are known to have remained well up to six months after discharge."—Yours, etc.,

L. E. NAPIER, M.R.C.S., L.R.C.P.,
Research Worker on Kala-azar,
Calcutta School of Tropical Medicine.

COLOMBO.
9th May, 1927.

THE DIFFERENTIAL DIAGNOSIS OF SMALL-POX AND CHICKEN-POX.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—Dr. Tomb concludes his article on the differential diagnosis of small-pox and chicken-pox, in your issue of last April as follows:—

"The differential diagnosis of chicken-pox and small-pox by means of the time interval elapsing between the 'date of onset of fever' and the 'date of outbreak of eruption' is accurate, simple and unambiguous and should be adopted in India by all Public Health authorities, since any intelligent subordinate can thus make the diagnosis quickly and accurately."

I am afraid this conclusion is neither practicable nor of universal application throughout India among the general population, that is not under constant medical observation as in mining and plantation camps or other large industries. After an experience extending over 40 years in dealing with these affections at Bombay, I consider it absolutely hopeless to rely upon the statement of the patients, either as to the onset of fever, or appearance of eruption. The ordinary ignorant and superstitious class of labouring people who form the bulk of our patients have scarcely any conception of fever and they would strenuously deny it, even with a temperature of 102° F. They generally continue working with higher temperatures even in graver affections, until they drop down. Nor are their powers of observation so acute as to enable them to fix the period of the appearance of a rash, either papular or vesicular. Recourse had therefore to be had on the more reliable method of observing the *character of the eruption* in determining the nature of the affections. The following points have proved of inestimable value in almost all cases in arriving at the positive diagnosis of chicken-pox:—

(*a*) Absence of the papular stage with or without preceding fever.

(*b*) Rapid vesiculation, with translucent oval or spheroidal vesicles, that are not coalescent, and do not appear in the order of sequence from head to foot as in small-pox.

(*c*) Complete collapsibility of the vesicles upon puncture.

(*d*) Absence of true umbilication—though false umbilication through rupture of vesicles may co-exist.

(*e*) Presence of the eruption in all its stages, early, advanced, partially dry, and even scabbing on the same part of the body owing to development of vesicles in successive crops, unlike small-pox.

(*f*) Absence of suppuration unless irritated by applications, scratching, or friction with clothing.

It is not at all uncommon in Bombay to come across cases of chicken-pox of great severity, especially among children, with daily elevation of temperature and development of fresh vesicles for three to five days. Such cases are likely to frighten the parents, and may, and do lead to errors in diagnosis by those who have had no opportunity of constant observation and differentiation between these two affections.—Yours, etc.,

N. H. CHOKSY, C.I.E., Khan Bahadur,
M.D. (Freiburg), F.C.P.S., L.M. & S.,
Late Medical Superintendent, Arthur Road Infectious Diseases and Maratha Plague Hospital.

NEPEAN SEA ROAD, BOMBAY.
25th May, 1927.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—In your issue for April, 1927, Dr. Tomb comments on the "time interval between the onset of fever and the appearance of the eruption" as a valuable diagnostic point in the differential diagnosis between small-pox and chicken-pox.

This point is undoubtedly an important one when dealing with intelligent and literate patients, but it is unreliable and of no great value when dealing with coolies and "jungly-folk," as they often report their illness of longer duration than it is in order to get more *khoraki* (sick leave allowance). Further, other small-pox patients who have only a slight eruption and a very modified form of small-pox sometimes deny all history of fever. Though simple, yet the method of relying on the time interval in question may be very fallacious when dealing with such classes of patients.

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The "shotty hardness" of the points of eruption in small-pox is an almost invariable feature of the disease and can be readily felt when the lesion is pressed between the thumb and finger. This "shotty hardness," together with enquiries as to the time-interval between the onset of fever and eruption, should lead to accurate diagnosis in almost all cases.—Yours, etc.,

SATYA KINKAR BISWAS,
Medical Officer.

KIRKEND, P. O. KUSUNDA,
JHARIA COALFIELD.
14th May, 1927.

"HE CEASED TO BE A DOCTOR."

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—I trust that it is not too late for a short reply to the ideas set forth under this heading by Major-General Ogilvie in your issue of March.

Major-General Ogilvie asks "Has the medical soldier really ceased to be a doctor?" Surely the answer depends on the extent to which his medical work and function are subordinated to, or affected by, the requirements of the service to which he belongs. Obviously the demands of the Army may on occasion be highly prejudicial to the realization of the ideals of medical service.

The references to "a knowledge of tactics," "knowledge of military organization and administration," "medical arm," serve but to show the emphasis laid on the purely military aspect of the "medical soldier's" work. The latter term infers that he is a soldier first, and a doctor second; (is there a difference between "army doctor" or "army surgeon" and "medical soldier"?). From General Ogilvie's own showing, the working out of these ideas of tactics and military organization must have a tremendous influence on the nature of medicine and medical work in the Army. Instead of a free untramelled profession, delighting in the freedom and infinite scope of its own service to the individual and the community as a whole, we have it beset with restrictions, which are necessarily dictated by military requirements. The burden is felt in the increase of time and energy which has to be devoted to organization and administrative activities—all largely due to the exactions of the combatant arms. It is medicine handicapped by the exigencies of military necessity.

This surely is the fundamental cause of the I. M. S. officer's (as doctor's) complaint, with which I have much sympathy. Who has not heard of the *contretemps* of military medicine, when the essential medical point of view has had to conform to the demands of good order, military discipline and other features of military organization? All this is no doubt highly necessary from the military point of view, but it is antagonistic to the wider spirit of medicine.

It would be easy to go further and argue that, whatever views we may hold regarding the necessity or advisability of a given conflict, the desolation and destruction of war itself are a sad antithesis to the aims of medicine. General Ogilvie would no doubt rightly reply that this is not cognate to his point. At the same time, it is the degree, to which medicine has to be subordinated to antagonistic ideas, which will decide the answer to his question.

It is for these and similar reasons that many a civilian medical man in India and also at Home feels the injustice of the demand that, in order to serve with the Indian Medical Service in its wide civilian activities, he is obliged first to undertake military service. Many of us, while understanding the reasons of those who make this demand, protest strongly against this forced conjunction of two totally separate conceptions. It is to be hoped that it will not be long before all Indian civilian service medical posts will be filled according to pertinent qualifications, without special regard to military service as such.

I must say that General Ogilvie's expressions and argument have only served to show me how much Army medicine is subordinated to military requirements, and leads me to suspect that the "medical soldier" is a good deal more of a soldier than a doctor, and *may* "have ceased to be a doctor."—Yours, etc.,

ROBERT J. GITTINS, M.D., CH.B., D.T.M. & H.

FRIENDS' MISSION HOSPITAL,
ITARSI, C. P.

BLACKWATER FEVER AND MALARIA.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—If blackwater fever is caused by malaria, and especially by the parasite of malignant tertian malaria, may I ask the following questions;

Why does blackwater fever not occur in all malarial countries?

Why is it unknown in the Straits Settlements, the "home," as one may say, of malignant malaria?

Why is it (in the Dooars) a very rare disease among the coolies, and yet very common in the Chinamen, Europeans, and in the last twenty years among the Bengal "babu-log" and their women-folk?

Why does quinine, if administered in the acute stage, often cause an increase in the blackwater in the urine? If the disease is of malarial origin, one would expect the reverse to be the case.

Why does one get cases where there is no history of malaria for months, but with a history of extreme fatigue, or of a "heavy night"?

Why is jaundice concurrent with the disease, and why does it appear in the skin in fifty per cent. of cases before the urine shows any sign of it?

Why is constipation very common in these patients—particularly in the Chinamen and in the wives of Hindu clerks?

Why does emetine often stop the vomiting, and more often reduce the temperature which continues after the urine has cleared up—i.e., the "post-hæmoglobinuric fever"?

Why should not the liver be in such a condition that it excretes a toxin which causes the whole trouble?

The argument that the "reduction of malaria shows a reduction of blackwater fever" does not prove that malaria is the cause. It only shows that if you improve the health of the resident in a blackwater area, you will reduce the chance of an attack of blackwater fever, neuritis, or even toothache.—Yours, etc.,

T. R. S. COSENS.

MANABARI P. O.,
DOOARS, B. D. RAILWAY.
29th May, 1927.

THE SPECIES OF MALARIA PARASITES.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—It seems to me that the much discussed question of mutation of species especially with regard to the malaria parasites can be settled once and for all by the co-operation of medical men in this country who are in a position to use their microscopes.

I have read with much interest Lieut.-Col. O. A. R. Berkeley-Hill's article in your issue for last May, and have been struck with the fact that subtertian crescents were found in the blood films from five patients who were inoculated with the blood of persons suffering from benign tertian malaria. At first sight this evidence appears quite a formidable argument in favour of the mutation of species theory, but there appear to be several loopholes in the evidence.

In the first place, there is nothing in the article to indicate that any preliminary blood examination of the inoculated patients was carried out; therefore there is a possibility, although it is a slight one, that these patients were harbouring a latent subtertian infection, which became lighted up upon the advent of the induced malarial attack.

What is more likely—and particularly so if the blood used on all five patients was obtained from the same

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donor—is that the donor's blood contained subtertian parasites in addition to the benign tertian organisms. I note that "all these cases, except Mrs. K., were treated with blood drawn from another person, while Mrs. K. was given malaria from a Bass' culture made especially for the purpose at the Calcutta School of Tropical Medicine" In the case report of Mrs. K., however, I note the following: "On 4th August the patient was injected intramuscularly with 1 c.c. of blood containing *P. vivax* ring forms from another patient." It was 15 days after this that she was injected with the Bass' culture. It is clear therefore that five patients were injected with supposedly benign tertian malaria, but that all of them subsequently showed subtertian crescents in their blood films. It would be interesting to know if the same donor was used for all five patients. If so, there would seem to be a very strong argument that the donor's blood contained malignant tertian parasites in addition to benign tertian ones. With only a few such malignant tertian parasites present in the donor's blood film, it would be quite easy to overlook them in the course of routine blood examination. How many of us have searched a film for acid-fast bacilli one day for 30 minutes and found nothing; only to pick up the same film the following day and find them immediately?

These five patients were either cases of latent subtertian malaria before injection—which is hardly likely —, or else they became infected with subtertian malaria as the result of inoculation, or subsequent to inoculation through natural channels of infection. It is evident that malaria must exist at Ranchi; else why did other patients (donors) have benign tertian malaria—unless we are to infer that they were newly arrived and already infected persons from other parts?

The fact that Mrs. K.'s blood films showed subtertian parasites proves nothing, if it is true that she received a previous inoculation of malarial blood, as the case report states. It only serves to strengthen the argument that the most probable source of the subtertian parasites was the inoculated blood of the donor. It would be interesting to know if the donor was the same person for all five cases, or whether several donors were used.

In such patients, treated by induced malaria, it seems that preliminary blood examinations should be made, say daily for one week, before inoculating them; if they are inoculated with benign tertian malaria, and subtertian crescents are subsequently found there can be only one of two explanations; either that the donor's blood contained malignant tertian forms, or that the patients have become infected with malignant tertian malaria subsequently to their inoculation with a benign tertian strain.—Yours, etc.,

A. E. CLARK, M.D.

NARSAPUR, WEST GODAVERY.
15th June, 1927.

AN INTERESTING PHENOMENON IN A CASE OF CLEFT PALATE.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—On May 27th, 1927, I saw a case of hare lip and cleft palate of an extreme degree in a female child of seven months of age. The cleft in the palate was bilateral. On the left side it was limited to the soft palate alone, and on the right side it was complete. During the investigation of the case a very curious phenomenon was elicited, which is of sufficient interest to demand publication.

Feeding was very difficult in the first week; suckling was impossible and spoon feeds escaped by the nostrils. During the second and third weeks the infant started using the index, and later the index and middle fingers, of the right hand to plug the cleft in the palate during feeding. She gradually put on weight, and is now a quite healthy baby of seven months of age. Sometimes when the baby cries, she uses this form of obturator.

The interest in this case lies in the infant's attempt at self-preservation. The great difficulty in feeding infants with such gross deformities in the first few weeks of life may be overcome by the parents' using this little tip, and encouraging the child to use its own fingers as an obturator.

I am much indebted to Dr. S. Subba Rao, who operated on this patient, for permitting me to publish the notes on the case.—Yours, etc.,

T. S. SESACHALAM, L.R.C.P., M.R.C.S.,
Assistant Surgeon.

VICTORIA HOSPITAL, BANGALORE.
30th May, 1927.

ARTHRITIS FOLLOWING SMALL-POX.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—With reference to Dr. Gopal Singh Chawal's letter in the correspondence columns of your issue for May 1927, with regard to arthritis as a complication of small-pox, I wish to say that arthritis as a complication of small-pox is neither very rare nor unheard of. I have myself seen four such cases in a village of population 8,000 in Ramnad District of the Madras Presidency, and I have reason to believe that there were further similar cases in the village. I have also heard of other cases in the neighbouring districts. I have myself seen ankylosis of both elbows, of one elbow, of elbow and hip on the same side, and of both elbows and knees, as a sequel of small-pox. W. R. Jack in the 1927 edition of his book gives purulent arthritis as a complication of small-pox, though Saville does not mention it in his *System of Clinical Medicine*.

At all events, arthritis following small-pox is not so uncommon a sequela as suggested.—Yours, etc.,

T. S. DAKSHINAMURTHI, L.M.P.,
Sub-assistant Surgeon.

SIRNGUPPA, BELLARY DISTRICT.
20th May, 1927.

* * * * * * * * *

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—In your issue of May 1927, Dr. Gopal Singh Chawal records a case of arthritis of both elbow joints as a sequel of small-pox. I may mention that such cases are seen occasionally, and that I have recently had one such case under treatment.—Yours, etc.,

P. N. SHAH, M.B., B.S.,
Medical Officer.

DABHOI, BARODA STATE.
1st June, 1927.

PAROTITIS AS A COMPLICATION OF LOBAR PNEUMONIA.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—In your issue for last June, under the above heading, a case of parotitis following pneumonia was recorded.

I treated a similar case some months ago. The patient was a young female with lobar pneumonia. She developed a severe double parotitis during the course of the disease and local treatment was of no avail. The glands suppurated on both sides and had to be incised.—Yours, etc.,

GURLEAKKSH SINGH, L.S.M.F.

JAIPUR LANCERS HOSPITAL.
18th June, 1927.

Service Notes.

APPOINTMENTS AND TRANSFERS.

Lieutenant-Colonel W. S. Willmore, M.D., I.M.S., is appointed to be Inspector-General of Civil Hospitals, Bihar and Orissa, with effect from the 6th May, 1927.

Lieutenant-Colonel R. W. Anthony, M.B., I.M.S., is appointed to officiate as Surgeon-General with the

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Government of Bombay, with effect from the forenoon of the 11th April, 1927.

Major R. F. D. MacGregor, M.C., I.M.S., an Agency Surgeon is posted as Residency Surgeon, Bushire, with effect from the 1st May, 1927.

The services of Captain S. L. Mitra, M.B., D.T.M. & H. (Edin.), D.P.H. (Edin.), I.M.S., are placed permanently at the disposal of the Government of Bihar and Orissa, with effect from the 5th September, 1925.

LEAVE.

Major H. G. Alexander, F.R.C.S., I.M.S., First Resident Surgeon, Presidency General Hospital, Calcutta, is granted leave on medical certificate for eight months from the date on which he avails himself of the leave.

Major R. B. Seymour Sewell, I.M.S., Director, Zoological Survey of India, is granted leave for three months with effect from the 30th June, 1927, or any subsequent date on which he may avail himself of it.

Major M. A. Nicholson, I.M.S., an Agency Surgeon, is granted leave on average pay for eight months, combined with study leave for a period of seven months and twenty-four days and leave on half average pay for two months and seven days, with effect from 1st May, 1927.

PROMOTIONS.

Colonel to be Major-General.

Colonel Godfrey Tate, M.B., V.H.S, *vice* Major-General Richard Heard, C.I.E., M.D., K.H.S. Dated 27th February, 1927.

Lieutenant-Colonels to be Colonels.

Roy Fearon Baird, *vice* Colonel Godfrey Tate, M.B., V.H.S. Dated 27th February, 1927.

George Hutcheson, M.B., *vice* Colonel Clement Henry Bensley, C.I.E., K.H.P. Dated 15th February, 1927.

W. S. Willmore, M.D., I.M.S., *vice* Colonel H. Ainsworth, M.B., F.R.C.S., K.H.S., I.M.S. Dated 3rd May, 1927.

Captains to be Majors.

S. L. Mitra, M.B. Dated 20th May, 1927.
E. Cotter, M.B. Dated 8th June, 1927.
C. J. Lodge Patch, M.C. Dated 19th May, 1927.

Lieutenants to be Captains.

H. W. Mulligan, M.B. Dated 29th November, 1926.
Daniel Kelly, M.B. Dated 1st August, 1926.

RETIREMENT.

Lieutenant-Colonel A. F. W. King, F.R.C.S.E. Dated 13th November, 1926.

NOTES.

"BOOTS, CASH CHEMISTS."

WE have recently received an item of news which we hand on to our readers with much pleasure. It is to the effect that "Boots, Cash Chemists" have undertaken a campaign to establish depôts of their well-known firm throughout India. One of the managing directors of the firm has recently toured India with this object in view; Mr. Ralph Paxton, 86-B, Clive Street, Calcutta, has been appointed representative in India of the firm; and the following distributing depôts have been arranged:—

Bengal: The Orient Co., 86-B, Clive Street, Calcutta.
Bombay: The Anglo-Siam Corporation, Ltd., Tamarind Lane, Fort.
Madras: Messrs. Allbutt & Co., Mount Road.
Burma: E. M. de Souza & Co., Dalhousie Street, Rangoon.
Ceylon: Cargills, Ltd., Colombo.
Straits Settlements: The Anglo-Siam Corporation, Market Street, Singapore.

"Boots, Cash Chemists" was started many years ago, if we remember rightly, by Mr. Jesse Boot in Nottingham. From small beginnings the firm gradually acquired a splendid reputation for reliability, for the purity of its drugs, and for the low prices charged. To-day, it covers the United Kingdom with a vast network of branches, and manufactures over 90 per cent. of the drugs which it sells. It has played a very important part in the National Insurance Scheme and Act, and is a supplier on a large scale to the National Ministry of Health.

What patients in India suffer from only too often are bad drugs, adulterated drugs—often sold at cheap rates, but not infrequently at high rates. There are many excellent British firms of chemists and druggists in India, but there is always room for a British firm with high ethical ideals and energy. The special feature of Boots' preparations are their reliability and their cheap rates of cost. Thus, on glancing through the price lists provided, we note 5 c.c. "Viules" of adrenalin chloride solution at Re. 1-8 per box of 6 viules; insulin—a viule of 5 c.c., at Rs. 2-10; absorbent cotton wool in a spool package, 2-oz. size, at Rs. 9-3 per dozen. These prices are subject to a discount of 10 per cent. for the medical profession and of 20 per cent. for hospitals.

A special feature of the work of Messrs. Boots in the United Kingdom is their very extensive manufacture of products for the treatment of venereal disease; in fact they are one of the largest suppliers in this respect to the Ministry of Health, and their products have the official approval of that Ministry. Of such preparations Stabilarsan is claimed to have a more permanent effect upon the Wassermann reaction than any other arsenical; Bismostab is a suspension of precipitated bismuth metal in isotonic glucose solution for intramuscular injection; Sulphostab is an arsenobenzol preparation for subcutaneous administration; whilst Thiostab is a stable 10 per cent. solution of sodium thiosulphate which has been found to give excellent results on intravenous administration in cases of dermatitits following the administration of arsenobenzol compounds.

A still further preparation of interest is Boots' tablet Chloramine-T for sterilisation of water supplies, or for the preparation of surgical lotions. The advantages of issuing this compound in tablet form will be obvious.

We can only wish the firm success in their venture into the Indian market. It is likely to benefit both patients and the medical profession in this country alike.

KURCHI BARK IN AMŒBIC DYSENTERY.

RECENT medical researches seem to favour the belief that, in the successful treatment of amœbic dysentery (one of the chief problems in tropical medicine) kurchi bark will prove to be of considerable value.

In the *Annual Report of the Calcutta School of Tropical Medicine* 1924, page 70, these words appear:—

"Another drug experimentally tested was Messrs. Burroughs Wellcome & Co.'s 'Tabloid' Extract Kurchi Corticis, the active principle of which is the alkaloid conessine. Two acute cases have so far been tested with it—both cases were pushed rapidly to a full dosage of 60 grains a day by the mouth. In both patients this dose was tolerated very well: the amœbic infection appeared to be eradicated: and the cure was apparently rapid and complete."

In the 1925 report of the same School it is stated:—

"Kurchi is extremely well tolerated in very large doses, and often appears to eradicate an amœbic infection."

Reference is also made to the fact that Kurchi is available when there are objections to stovarsol and yatren on the score of uncertainty, ocular complications and high prices.

As a result of these investigations Burroughs Wellcome & Co., yet again in the van of pharmaceutical progress, are issuing "Tabloid" Kurchi Bark Extract, gr. 5, for more extended clinical trial in the treatment of amœbic dysentery.

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ANABOLIN

(Harrower)

REDUCES BLOOD PRESSURE

Here is the chart of a typical case. It is that of a woman, aged 52 years, past the menopause. Kept on small diet. General health—fair. The chart shows the reaction following the injection of 1 c.c. Anabolin Solution daily.

	B. P. before injection.	*B. P. after injection.*
1st day	246	246
2nd day	247	246
3rd day	246	205
4th day	206	190
5th day	190	175
6th day	170	162

Patient then placed on Anabolin Tablets, and B. P. steadied to 160 *and remained there.* Diet enlarged. General health showed great improvement.

ANABOLIN

REDUCES BLOOD PRESSURE

Literature and complete details from—

THE ENDOCRINE LABORATORY, SIMLA.

ENDOCRINES LIMITED

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"KAYLENE" PREPARATIONS.

A series of very elegant preparations for the treatment of intestinal disorders are those prepared by Kaylene, Ltd., 7, Mandeville Place, London, W.1. It is gradually but surely being recognised that in kaolin we have a remedy of special value in the treatment of gastro-enteritis, cholera, and similar disorders; but it is important that the kaolin shall be pure and shall be in a state of very fine suspension, or more harm may be done than good by its administration.

"Kaylene" is a colloidal reversible hydrated silicate of aluminium of great purity, prepared by a physico-chemical process, and possessing great absorptive powers. It is so finely pulverised that its particles when in suspension show active Brownian movement. The chief indications for its administration are ptomaine poisoning, cholera, diarrhœa—from whatever cause, since it is non-irritant, and an absorbant of intestinal toxins under many different conditions of intestinal toxæmia. Its suspension in water, it is claimed, remains opalescent for several days, and 95 per cent. of the particles in the suspension are of diameter of 1 μ or less.

Of other preparations derived from "Kaylene" itself, one may mention Kaylene dulcis—a sweetened Kaylene; Kaylene saline—in which Kaylene is combined with saline laxatives; Kaylene mint—where it is combined with carminatives; Kaylene lax—where it is combined with phenolphthalein; and Kaylene-ol, where it is combined with a very pure liquid paraffin.

The range of utility of such a series of preparations, especially for private patients, is obviously a very large one. Thus in states of acute gastro-enteritis administration of Kaylene itself will exercise a soothing action on the gut, coating it with a protective layer; in conditions of intestinal toxæmia, its great absorptive power will come into play; in chronic constipation, when combined with a laxative, as in some of the above named preparations, it will have a mechanical and regular laxative action.

THE BLOODLESS PHLEBOTOMIST.

Of the making and sending out of trade journals there is no end. One, however, which is distinctly interesting is *The Bloodless Phlebotomist*, issued by the Denver Chemical Manufacturing Co., 163-167, Varick Street, New York, the manufacturers of Antiphlogistine. Antiphlogistine is so well known and so valuable a remedy in a hundred and one conditions of inflammation and suppuration, and especially in pneumonia, that it needs nothing from us except a word of praise as to its merits, and a mention of its special value in dental as well as in medical work.

Despite its rather queer title, the *Bloodless Phlebotomist* contains many curious and intriguing items culled from different sources. Thus the cover gives a most quaint picture of an alchemist's room. A number recently to hand deals with human "tails"—which appear to be more of the nature of dermoid cysts than true caudal appendages; an illustration of a most quaint mechanical device for the removal of tapeworms patented by a Dr. A. Muets in U. S. A. in 1854—a device which we are certain never succeeded in entrapping any tapeworm; "A Treatise on the Serpentine Disease" a rare volume published by a Dr. Ruy Diaz de Ysla more than four hundred years ago, in which he attributes the introduction of syphilis into Europe to the return of Columbus' sailors from the Caribbean Seas; and even medical limericks.

Interspersed throughout the brochure are given indications for the use of Antiphlogistine. Copies are available on application to the Indian agents, Messrs. Muller and Phipps (India), Ltd., Calcutta, Bombay, Madras, and Rangoon.

HICKS' THERMOMETERS.

It is very important for the medical practitioner in India to have a reliable brand of clinical thermometer, both for his own use, and to recommend to his patients, for the Indian market abounds with cheap—and often grossly inaccurate—thermometers. And in this respect he cannot do better than stick to the thermometers manufactured by James J. Hicks, who are perhaps the premier thermometer makers in the world and whose present day business organisation is a very large one. The firm is of old standing and of high ethical reputation, and each instrument is tested by an expert before it leaves the factory. The Indian agent, Messrs. Allen & Hanburys, Ltd. (Mr. A. H. P. Jennings, special representative), Block E, Clive Buildings, Calcutta, will at all times be pleased to forward price lists and information on application.

THE "SUNIC" FLAT POTTER-BUCKY DIAPHRAGM.

Messrs. Watson and Sons (Electro-Medical), Ltd., Sunic House, Parker Street, Kingsway, London, W. C. 2, announce the introduction of a new *flat* model of Potter-Bucky diaphragm. The following is their description of the apparatus:

The principle of the Potter-Bucky Diaphragm and the extent to which it assists the radiologist in the production of cleaner and better radiographs by eliminating scattered radiation is now generally understood. It may, in fact, be said that a Potter-Bucky Diaphragm is an essential item in the equipment of every modern *x*-ray installation.

That the efficiency of a Potter-Bucky Diaphragm depends very largely upon its design, and the quality of materials and workmanship employed in its construction, or, in other words that there are good and bad Potter-Bucky Diaphragms is also common knowledge.

Hitherto the highest degree of efficiency has only been secured in a curved Potter-Bucky Diaphragm and the "Sunic" curved model has perhaps represented the most successful translation of the Potter-Bucky principle. It has, however, been apparent that substantial advantages would be gained if it were possible to embody the same high degree of perfection in a flat diaphragm and therefore we have for some time past concentrated our efforts on the production of a flat Potter-Bucky Diaphragm. We have now accomplished our task to our complete satisfaction, and in introducing the "Sunic" flat Potter-Bucky Diaphragm we should like it to be clearly understood that its advantages have been secured without any corresponding sacrifice in quality. The desirable features which distinguish the "Sunic" curved model, careful choice of materials, sound design, robust construction, extra fine grid and excellent workmanship and finish, are all to be found in the new "Sunic" flat model, together with several other advantages which cannot be associated with a diaphragm of the curved type.

The subject radiographed, particularly the outer portions, shoulders, hips, etc., can be brought nearer the film, thus reducing distortion and ensuring better definition. Further, the absence of curvature enables the hip or shoulder to be centred over the middle of the grid when radiographs of these parts alone are required. This makes it possible to bring these parts of the body much nearer to the film and thus to secure infinitely better radiographs and at the same time to effect a substantial economy in films as it is only necessary to use a film of sufficient size to cover that portion of the body it is desired to radiograph.

In addition to technical advantages the new model has several claims to superiority from the points of view of comfort to the patient and convenience to the operator.

When the diaphragm is used on a table top it is much easier to place the patient in position and less discomfort is experienced in lying for some time on the flat than on the curved surface. Moreover the top of the new model being of wood instead of metal, it is warmer to the touch and less likely to disturb the patient when he is first placed in position.

It is of course a very simple matter to fit the flat Potter-Bucky Diaphragm flush with a flat table top, and this is the ideal arrangement where aged or infirm patients are to be radiographed.

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As to convenience from the point of view of the operator, it is only necesary to state that the new diaphragm is considerably smaller and no less than 10 lbs. lighter than the old model to show that it is much easier to handle and to carry from place to place.

Still another advantage that may be mentioned is the fact that the diaphragm will work satisfactorily in any position. Many curved Potter-Bucky Diaphragms can only be used successfully in the horizontal plane.

The cost of the new flat model is £45, and the catalogue No. Z|8140.

The same firm have recently published a very attractive celluloid-covered "warning" notice for *x*-ray users. In this, ten rules for the use of *x*-ray equipment are succinctly set forth, the chief being "First, last, and always, never attempt any adjustment whatsoever without satisfying yourself that the main switch is off." This notice in its celluloid cover is fixed inside the cabinet of the transformer, whilst copies are also supplied for hanging on the wall of the *x*-ray room. A third copy, not celluloid covered, is supplied with all instructions.

The notice is very well designed and drafted, and will be very useful to *x*-ray workers.

GLAXO AND THE MILK PROBLEM IN INDIA.

THE position of the milk problem in India is succinctly stated in a resolution of the Government which declares that—"The adulteration of milk is almost universal in Indian bazaars, and a large amount of the milk consumed is contaminated. In most cities the milk supply is in the hands of men ignorant of the elements of sanitation and addicted to uncleanly practices. Moreover, the milk when stored and in transit to market is liable to contamination."

Apart from the question of pollution the point in the problem which exercised us most in clinical work, is the vitamin content of Indian milk.

We all know that *cows cannot synthesize vitamins, but are dependent upon their foodstuffs for the vitamin which is present in the milk.*

Here in this country, "as there is no scientific breeding, so there is no scientific feeding, and the buffalo or cow is turned out to find its living on burnt and bare patches, whilst even cows from Europe rapidly deteriorate under a diet consisting of straw and hay, ripened and burnt to a cinder by a tropical sun."

Such food lacks the vitamins so essential to milch cattle, and it is obvious that under such conditions their milk must be an entirely different product to that provided by animals fed on the luscious pasturage of New Zealand.

The average well-to-do Indian keeps his own cow, and one has often been consulted by an anxious mother who has been unable to understand why the milk of this home-fed animal disagreed, or why her children were not thriving on it. "It was not so easy to answer these questions some years ago, but we now know that the reason was absence of vitamins which should have been derived from the animal's own food-supply and were not." (*The World's Health, Jan.* 1926.)

We think that this lack of vitamins has led many of our readers to adopt Glaxo in infant-feeding and the recent experiments of Dr. G. Hartwell seem to justify their choice.

She has found that dried milk is quite equal in dietetic value to cow's milk; "if there is any advantage it appears to be in favour of the dried variety." (*British Medical Journal, 13th June,* 1925).

FISCHER'S MAGAZINE.

THIS is one of the small trade journals that are now becoming so prominent a feature of present-day advertising by chemists and others. It is published by H. G. Fischer and Co., Chicago, and deals with electro-therapeutics. It is both interesting and well edited. In a number recently to hand various articles by American medical authors deal with the low wave generator in the treatment of gastro-intestinal stasis; diathermy in gonorrhœal epididymitis, with a report on eleven cases treated; the treatment of burns by actinotherapy; and a very interesting article by Dr. F. H. Walke on electro-physiotherapy in the treatment of gynæcological conditions. Tonsil fulguration is discussed as being a better line of treatment than surgical operation on the tonsils; whilst Drs. J. W. Sooy and T. S. Moise contribute a preliminary report on the treatment of idiopathic purpura hæmorrhagica by exposure to the mercury vapour quartz lamp.

The journal is published monthly, and a limited number of copies are available from Malgham Bros., 19, Bank Street, Fort, Bombay for issue free to medical men who send in applications.

WATER-SOLUBLE OVARIAN AND TESTICULAR EXTRACTS.

As is generally recognised, the oral administration of endocrine products may be followed by their non-absorption in an active state. Administration of thyroid extract by the mouth gives rise to a definite thyroid effect; with adrenalin some effect is produced, but less than when the active principle is given hypodermically; with the other endocrine glands results are less certain. Hence the active water-soluble extracts of ovary and testis, now put on the market by the Research Products, Ltd., 12 and 13, Henrietta Street, Strand, London, W. C. 2, are of interest. These products are the result of three years' work at the Pickett-Thomson Research Laboratory in London. The preparations are put up in 1 c.c. ampoules for hypodermic injection. Administration of the ovarian hormone is advised in cases of dysmenorrhœa, amenorrhœa, menorrhagia, the climacteric, and puerperal debility; administration of the testicular extract in cases of impotence, neurasthenia with impotence and neurasthenia of adolescence. In phthisis also results are claimed to be good, and the patients so treated put on weight.

Clinical results appear to indicate that when the products are given by hypodermic injection, definite effects are produced. Further, there is a complete absence of local reaction after injection. The Indian agents are Messrs. Martin and Harris, 8, Waterloo Street, Calcutta.

Publishers' Notice.

SCIENTIFIC Articles and Notes of interest to the profession in India are solicited. Contributors of Original Articles will receive 25 reprints *gratis*, if asked for at the time of submitting their manuscripts.

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Original Articles.

A MEDICO-LEGAL STUDY OF THE CALCUTTA RIOTS OF 1926.

By J. C. DE,

MAJOR, I.M.S.,

Police Surgeon, Calcutta.

DURING the summer months of 1926 the peace and orderly progress of the city of Calcutta were violently disturbed by three successive communal riots, resulting in loss of life to 141 and injury to 1,201 individuals.

In this connection 124 dead, the victims of the riots, were subjected to post-mortem examination at the Police Morgue, Calcutta. As all the victims succumbed from homicidal injuries the occasion presented an exceptional opportunity of studying such injuries and their effects, and further the types of injuries that may be expected during riots. This is my excuse for presenting this paper, which, it is hoped, will be of interest to those whose duties take them to courts as expert medical witnesses, and who, in course of evidence, are called upon to give their considered opinion regarding the nature, mode of causation, and the effect of injuries on the victim.

TABLE I.

	Commenced.	Finished.	Duration.
First riots ..	2-4-26	8-4-26	7 days.
Second riots ..	22-4-26	29-4-26	8 „
Third riots ..	18-7-26	22-7-26	5 „

A striking feature of the riots, as shown in Table I, was that each of them lasted approximately a week.

TABLE II.

During	Number killed in streets.	Number injured and died subsequently in hospital.	TOTAL.
First riots ..	12	30	42
Second riots ..	20	34	54
Third riots ..	8	20	28

As shown in Table II, the second riots were those responsible for the largest number of deaths, as also for the largest number killed outright in the streets.

TABLE III.

Greatest intensity of the riots.

		Total killed outright or mortally injured.
First riots ..	First two days	22
Second riots ..	Fifth and sixth day	26
Third riots ..	First day	14

TABLE IV.

Principal causes of death.

These were as follows:—

Stab wounds alone ..	50 cases
Head injuries with fractures of the skull	31 „
Gunshot wounds	19 „
Cut wounds	4 „
Mixed injuries	20 „

It will be seen from Table IV that stab wounds were responsible for the largest number of deaths (40·3 per cent.), and for a little more than one and a half times as many fatalities as the next chief cause of death, viz. head injuries with fractures of the skull.

TABLE V.

Total number of wounds.

The total number of wounds found on the 124 dead persons was 511, and they were distributed as follows:—

Contusions	94
Cuts and stabs	208
Lacerated wounds	190
Gunshot wounds	19

making an average number of 4·13 wounds per individual. The corresponding averages for the three different riots worked out at 4·1, 5·0, and 4·8 per individual.

TABLE VI.

Multiplicity of wounds.

Single injuries	24 persons
1 to 4 injuries	75 persons
5 to 9 injuries	12 persons
10 or more injuries ..	13 persons

The largest number of injuries found on any one person was 17. The majority of the head injuries consisted of incised or lacerated wounds; stab wounds occurred mostly in the chest, and the largest number of such found in any one person was five. Stab wounds of the abdomen were mostly single.

TABLE VII.

Mortality with reference to age, sex, and caste.

Age.	Sex.	Hindus.	Mohamedans.	TOTAL.
10 to 20 years	Male.	1	4	5
20 to 40 „	Male.	50	30	80
40 to 60 „	Male.	17	19	36
Over 60 „	Male.	1	2	3
TOTALS ..	All males.	69	55	124

A relieving feature of the above table is that there was no female among the killed, nor any children or very old males. The youngest male killed was aged 18 and was shot accidentally, whilst the oldest male was a *fakir* who had somehow got sandwiched between the rioters. To some extent the sparing of women and children showed the survival of a grain of humanity among the welter of passions let loose.

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TABLE VIII.

Summary table of stab wounds of the chest. Total number of wounds, 54.

Location.	Number. P.	Number. N P.*	Organs injured.	Average size of external wounds.	Internal bleeding where heart alone injured.	Internal bleeding where heart and lungs injured.	Duration of life where heart alone injured.	Duration of life where heart and lungs injured.
1. Over left subclavicular and mammary regions (2nd-4th space).	9	Nil	Heart alone in 3 cases. Heart and lung in 6 cases.	1½″ × ½″ × 3″.	40 ozs. respectively. 30 ozs. respectively. 8 ozs. respectively.	Average 20 ozs. Minimum 14 ozs. Maximum 40 ozs.	Nil, 2 20 minutes 1	Nil. or few minutes 4 20 minutes 1 50 „ 1
2. Over right subclavicular and mammary regions (2nd-4th space).	5	Nil	Right lung .. 3 Heart, right auricle .. 1 Ascending aorta .. 1	2″ × 1″ × 3″.	30 ozs.	Nil	Few minutes.	Nil
3. Over back of the chest. Right side Upper Middle Lower	1 2 6	6 2 3	Right lung .. 5 Liver .. 2 Penetrating but not injuring an internal organ .. 2	Average size of penetrating wounds 1¼″ × ½″ × 3½″	Internal bleeding varied from 2 ozs. to 80 ozs. Average, 24 ozs.		Duration of life varied considerably from a few minutes to 36 hours.	
4. Over back of the chest. Left side Upper Middle Lower	Nil. Nil. 3	5 Nil. 4	Left lung .. 3 Heart, left auricle .. 1 Descending aorta .. 1 Liver .. 1					
5. Do. sides of the chest. Right Left	2 2	2 2	Right lung .. 1 Left lung .. 1 Penetrating but not injuring an internal organ .. 2	1¾″ × ½″ × 2″.	Average, 10 ozs.		From 7 hours to 9 days.	

* P. = penetrating, and N. P. = non-penetrating wounds.

Remarks on stab wounds of the chest resulting in death.

Total deaths due to this cause .. 25
Total stab wounds found on the 25 dead 54

Of these 34 were penetrating and 20 non-penetrating wounds.

A point worth noting here is that 62·3 per cent. of all stab wounds of the chest were penetrating injuries and in all, except in 4 cases only, had penetrated an important internal organ, a point worth remembering when dealing with these injuries during life.

The non-penetrating stab wounds of the chest were all situated over the back, and of these eleven, or more than half the total, were situated over the shoulder blades, which no doubt proved an obstacle to penetration. The stab wounds of the front of the chest predominated, as might be expected, on the left side (9 out of 14) and those of the back predominated on the right side (19 out of 31).

Of these various stab wounds three penetrated directly through bone. In one case the weapon had passed through the upper part of the right half of the sternum, corresponding to the level of the second inter-costal space, and had cut into the ascending aorta 1 inch above its root. The internal bleeding amounted to 40 ozs. and the man died in a few minutes.

In a second case the weapon had passed through the lower part of the left half of the sternum, corresponding to the level of the 5th inter-costal space, injuring underneath the pericardium and the right ventricle of the heart. The internal bleeding amounted to 8 ozs. only. The man was found dead in the street and the smallness of the internal bleeding suggested death in a few seconds.

In a third case the deceased had a stab wound over the spine at the level of the 4th dorsal vertebra, which had gone clean through the vertebra and the spinal cord and had cut into the descending aorta ½ inch above the bifurcation of the trachea. The internal bleeding amounted to 50 ozs. The man was found dead in the street and must have died within a few minutes.

With regard to the frequency of injury to the internal organs in these 25 cases of stab wounds of the chest

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(*a*) Wounds of the heart alone occurred in 4 individuals.

(*b*) Wounds of both heart and lungs occurred in 7 individuals.

(*c*) Wounds of the lung only (including two cases in which the liver also was injured) occurred in 12 individuals.

weapons resembling a knife of large type, such as a clasp knife or dagger, measuring roughly 3 to 4 inches in length and ¾-inch in breadth. Most of the stab wounds showed clear-cut edges and corners, showing that the weapons used had probably been especially sharpened for the specific purpose.

TABLE IX.

Stab wounds of the abdomen. Total number of wounds, 20.

Location.	No.	Organs injured.	Average size of external wounds.	Internal bleeding.	Duration of life.	Where died.	Operation.
1. On the epigastrium ..	4	Liver, 4, stomach, 1.	1¾″×½″×3½″	From 24 to 48 ozs., average 34 ozs.	Short time; longest 4 hours in one case.	Hospital	Nil.
2. On umbilical region ..	3	Small intestine, 1 (jejunum). Mesentery of small intestine, 1. Stomach and duodenum, 1.	Do.	From 6 to 18 ozs.	Up to 40 minutes.	Do.	Do.
3. Hypochondrium (Right) ..	2	Jejunum. Transverse colon.	Do.				
4. Hypochondrium (Left) ..	5	Stomach. Descending colon. Transverse colon, 2. Jejunum.	1″×½″×3″	Nine cases were operated on; all died.	15.6 hours on the average; 2½ hours after stab wound of liver. 6 hours after stab wound of spleen and splenectomy.	Do.	In all except 3, viz., stab wounds of the loin and in one involving the stomach.
5. Iliac region (Right) ..	2	Cæcum and ileum, 1. Nil, 1.	1″×½″×2″				
6. Iliac region (Left) ..	1	Descending colon.	Do.				
7. Loin (Right) 1, (Left) 2 ..	3	Nil, 1. Liver, 1. Spleen, 1.	1″×⅓″×2″				

The order of frequency of wounds of the various chambers of the heart was as follows:—

Left ventricle, thrice; right ventricle, twice; both ventricles, twice; auricles, once each.

With regard to the duration of life after wounds of the heart, 9 patients either died in the street or on their way to hospitals, whilst one lived for 20 minutes and another for 50 minutes respectively. The former had a stab wound 5|8 inch long transfixing the heart near its apex, going through both ventricles, penetrating through the diaphragm into the abdominal cavity and inflicting a cut 3|8 inch long on the anterior wall of the stomach. The internal bleeding amounted to 40 ozs., and the man lived 20 minutes. In the second case the stab wound had penetrated through the upper lobe of the left lung into the cavity of the left ventricle, the wall of which was cut across transversely for 3|8 inch. The internal bleeding amounted to 50 ozs. and the man lived for 50 minutes.

The bulk of the stab wounds were inflicted by

Remarks on stab wounds of the abdomen.

Of the 20 fatal cases of stab wound of the abdomen, 17 out of 20 had stab wounds entering in the front of the abdomen. In all instances the abdominal cavity had been penetrated, and in 18 cases some important viscus had been injured; in 2 the stomach, in 8 the liver, the small intestine in 4, the large intestine in 6, and the spleen in 1 case. In the 4 cases where the liver alone was injured, death took place shortly afterwards and the average amount of internal bleeding was 26 ozs. In one patient in whom the abdomen was opened and the liver stitched death took place 4 hours later. The 2 cases where the stomach was injured died within a few minutes of admission to hospital. Of 9 patients who were operated on, 5 showed injuries to the large intestine, 2 to the small intestine, and 2 to both small and large intestines. The average duration of life after injury to the large intestine was 26 hours, after injury to the small intestine 20 hours; where both were injured 15 hours; and the average of all 9 patients, 15·6 hours. Two other

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individuals died after a lapse of some days from peritonitis, one after a stab wound of the right iliac fossa without injury to any viscus in 3 days, and another after stab wound of the right hypochondrium with perforation of the jejunum in 9 days.

TABLE X.

Stab wounds of the neck, 4 cases.

	Location.	Number of wounds.	Organs injured.	Size of wound.	Where died.	Duration of life.
1.	Root of left side of neck.	1	Left innominate vein.	½″ × ¼″ × 2½″.	Street.	?
2.	Stab wound right side of neck, just below tip of right mastoid process.	1	Vertebral artery.	½″ × ¾″ × 2½″.	Hospital.	6 hours.
3.	Suprasternal angle.	1	Right common carotid artery and right lung.	1½″ × ½″ × 3½″.	Street.	?
4.	Left side of neck near angle of lower jaw.	1	Left common carotid artery and œsophagus.	¾″ × ¼″ × 1¼″.	Street.	?

In Table X only one case calls for comment. Case No. 2 was a young well-nourished male aged 30, who had a small wound measuring ½ × ¼ inch on the upper part of the right side of the neck, just behind the tip of the mastoid process, with no other injury. It was a very simple, superficial looking wound, and yet had caused death. On dissection it was found that the wound was 2½ inches deep, had opened the spinal canal through the occipito-atlantoid ligament, and had cut open the right vertebral artery obliquely, where it winds round the posterior arch of the atlas. There had been free bleeding around the stem of the brain, and the blood had forced its way through the roof of the 4th ventricle up the iter into the 3rd ventricle, and further into the lateral ventricles. The patient died 4 hours after the injury. This case serves to illustrate the point previously mentioned that the most innocent looking stab wound may be quite deadly.

One further patient, not recorded in the above tables, died from a stab wound of the thigh involving the femoral vessels.

TABLE XI.

Cut wounds of the neck, 3 cases.

	Location.	Size of wound.	Where died.	Structures injured.	Duration of life.
1.	Across middle of left side of neck.	4″ × 2½″ × bone deep.	Street.	Trachea just below cricoid cartilage: 7th cervical vertebra opening into spinal canal: left common carotid artery, vein and vagus nerve.	?
2.	Upper part of left side of neck from angle of jaw to mastoid process.	4″ × ½″ × muscle deep.	Hospital	Muscular vessels and nerves: (had also a stab wound on left loin and kidney).	24 hours.
3.	Back of the neck.	4″ × ¼″ × 2″.	Do.	Muscles, muscular vessels, and nerves.	7 days. (Died of pneumonia.)

Case 1 in Table XI is worth noting. Here, although the deceased had an extensive cut wound across the neck, the bleeding had been insignificant. He had three other injuries to the head. It was reported that the man was assaulted on the head by several persons, and fell down unconscious, whereupon a passing taxi driver got

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out of his car and deliberately cut the patient's throat and then escaped. The insignificance of the bleeding from the wound of the neck seems to be consistent with this report of what had occurred. The incident well illustrates the fury and blood lust raised during these communal riots.

Two patients were operated on; in one of these cases splenectomy was done, but the patient died in 3½ hours.

In addition to these 7 cases of gunshot wound of the abdomen there was one fatal case of gunshot wound of the thigh. The entrance wound measured 3|16 inch and was situated in the upper

TABLE XII.

Fractures of the skull.

Type of fractures and total number.	Ages.	External injury.	Internal injury.	Situation of injury.	Where died.	Duration of life.
Comminuted fractures, (7)	70 years, 1. 55 years, 1. About 35, the others.	Lacerated wounds in 5. Cut wounds by a chopper in 2.	Membranes and brain lacerated in 3 and only contused in 4.	R. forehead, 1. R. side of head, 1. R. back of head, (2). L. side of head, 2. L. back do., 1.	Hospital, 5. Street, 2.	Where membranes and brain were lacerated, from a few minutes to 3 hrs. Where these structures were contused, under 12 hrs.
Depressed fractures, (6)	60 years, 1; others 30 to 45 years.	Lacerated wounds, 4. Contusions, 2.	Membranes and brain lacerated in 3 and contused in the other 3.	R. temple, 1. R. back of head, 1 L. forehead, 1. L. temple, 3.	Hospital.	All cases were operated on. Average duration of life 11 hrs., except one man who died in 3 days from meningitis.
Fissured fractures, (18)	55 years, 1; others young and middle aged men.	Lacerated wound in 4. A bruise in the other, 14.	(*a*) Extra-dural hæmorrhage in 6. (*b*) Laceration of membranes and brain, 2. (*c*) In all others contusion of these structures.	R. temple and side of head, 4. L. temple and side of head, 6. Top of head, 3. Back of head, 5.	Hospital.	(*a*) Average duration where membranes and brain were lacerated, from a few minutes to 6 hours. (*b*) With extra-dural hæmorrhage (not operated on) 11½ hrs. (*c*) With contusion of brain and some surface hæmorrhage on brain, 40 hours.

Gunshot wounds of the abdomen resulted in 7 deaths. Of these injuries, 2 were situated over the back, 1 over the left hip and 4 in front. In only 3 cases was there an exit wound. The average size of the entrance wounds was ¼ inch and of the exit wounds ¼ inch. In one case a revolver bullet was found in the abdomen; here the entrance wound measured 5|16 inch and there was no exit wound. The internal injuries were chiefly those to the intestines in 4 cases; in 2 other instances the viscera injured were the spleen and kidney respectively.

Except for one instance, where the external iliac vessels were injured and the victim died on the spot, the other patients died in hospital at periods varying from 3½ hours to 5 days from shock, peritonitis, and—in one case—pneumonia.

front quadrant of the right hip, with an exit wound 1 inch in diameter above the fold of the nates. The head of the left femur had been shattered and the patient died in hospital.

Gunshot wounds of the chest were responsible for 7 deaths. The entrance wounds were in 2 instances over the back of the right shoulder, 1 on the right side over the 9th intercostal space, in 2 in the front of the chest, and in 2 on the left side of the back. Of the 7 deaths one was due to the use of a shotgun. There were exit wounds in 5 of the 7 cases. With regard to the internal injuries, the heart and lungs were injured in 5 instances, in 1 the lungs only were injured, and in another the spleen only. The internal bleeding amounted on an average to 25 ozs. The wounded died on the spot or on the way to hospital,

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except in the case where the spleen only was injured. This patient was immediately subjected to splenectomy, but died 3 hours later.

One case deserves special mention. In this case an eyewitness swore that the victim was deliberately shot by a police sergeant with a revolver. Examination showed in the middle of the left side of the back 17 small round shot holes covering an area 3½ inches in diameter. Both lungs and the aorta showed perforations. The internal bleeding amounted to 32 ozs. and the man died on the spot. Buckshot was recovered from the injured viscera. The true facts of the case were that the deceased was shot by a policeman armed with a shotgun whilst in the act of making an attack upon the police sergeant with a spear. The medical evidence entirely disproved the story of the eyewitness.

Gunshot wounds of the head accounted for 4 deaths. All were revolver wounds, and there was no exit wound in any case. The bullet was found in 3 cases; in the 4th it had presumably passed out through the entrance wound, which was gaping. The brain was badly lacerated in all instances. Two individuals lived a short time; one with a severe laceration of the right cerebral hemisphere who lived 1 hour 40 minutes, and another with laceration of the frontal and temporal lobes, who lived for 3 hours.

TABLE XIII.

Gunshot wounds of the abdomen, 7 cases.

Entry.	Location, height, character and size of wound.	Exit wound	Height and character of exit wound.	Direction of fire.	Organs injured.	Internal bleeding.	Where died.	Duration of life.
1. Over left sacro-iliac joint.	Round, 7|16″.	Nil.	..	From behind directly forward.	Small bowel.	12 ozs. opalescent fluid due to peritonitis.	Hospital.	5 days.
2. Right side of bed sore area.	Round, ¼″. Height, 3′—1½″.	Yes.	1¼″ × ½″, elongated. Right lower part of umbilical region. Height, 3′—2½″.	From behind forwards, upwards and inwards.	Right external iliac artery and vein. Bowel not injured.	24 ozs.	..	Died on the spot.
3. Upper front quadrant of left hip.	Round, ¼″. Height, 3′—2″.	Yes.	Oval, 1″ × ½″. Left iliac region, 3′—2½″.	From left to right and forwards.	Sigmoid flexure and colon.	20 ozs. opalescent fluid due to peritonitis.	Hospital	..
4. Left side of abdomen.	?	Nil.	..	?	Spleen surgically removed.	..	Do.	3½ hrs.
5. Right umbilical region.	Round, 5|16″. Height, 3′—2″.	Nil.	Revolver bullet found over upper anterior quadrant of ilium.	From right to left, backwards and downwards.	Small bowel in four places.	4 ozs. blood and flakes of lymph.	Do.	18½ hrs.
6. Right lumbar region.	Round, ¼″. Height, 3′—4½″.	..	Round, ½″. Left lumbar, Height, 3′—1½″.	From right to left.	Lower pole of left kidney perforated. No bowel injury.	12 ozs.	Do.	½ hr.
7. Do.	Operated.	Nil.	..	..	Small bowel.	..	Do.	8 hrs

Gunshot wounds in general.—These in all accounted for 20 deaths. Where the projectile could not be found, in many cases the nature of the firearm used remained a matter for conjecture. It was found, however, that revolver and pistol wounds usually showed an entrance wound measuring from 1|3rd to ½ inch in diameter,

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whilst the bullet frequently lodged in the body and there was no exit wound. In all cases the course of the bullet inside the body was in a straight line, joining entrance to exist wounds, where the latter existed (9 out of 19 instances). No body showed more than one bullet injury. Entry and exit wounds, where the latter were present, corresponded in numbers and there was no multiplicity of exit wounds although bones were injured in 13 out of the 19 cases. Signs of fire from close quarters were absent in all cases, and there was no burning, scorching or tattooing by powder in any of the entrance wounds.

TABLE XIV.

Gunshot wounds of the chest. Total 7.

Entry.	Height, character and size.	Exit wound. Height, character and size.	Direction of fire.	Organs injured.	Internal bleeding.	Nature of weapon.	Where died.	Duration of life.
1. Right side, 9th inter space post-axillary line.	Round 3|8″. Height, 3′—9½″.	Left side, 2″ above and to the left of left nipple. Height, 4′—1″. Long, 2nd slit, 5|16″.	From below upwards, forward and to the left.	Lower lobes, both lungs. Left ventricle heart. 9th right and 5th left ribs fractured.	30 ozs.	Revolver.	On the spot.	
2. Lower part front middle line of chest.	Round, 1|6″. Height, 4′.	Middle left back. Ragged wound, 7|16″. Height, 3′—11½″.	From before backwards, downwards and to the left.	Right ventricle of the heart.	24 ozs.	Rifle or machine gun.	On the way to hospital.	
3. Front left chest, 2nd inter space 1″ to left of middle line.	Round, 1|6″. Height, 3′—8¾″.	Back of right shoulder. Round 1|6″. Height, 3′—9¾″.	From before backwards, upwards and to the right.	Pulmonary artery. Superior vena-cava. Upper lobe right lung: 4th rib fractured behind.	26 ozs	Do.	On the spot.	
4. Back of right shoulder.	Round, ¼″. Height, 3′—11½″.	Just above anterior fold left axilla. Split, ⅝″×¼″. Height, 4′.	From right to left.	Both lobes of left lung. 3rd rib fractured.	18 ozs.	Do.	On the way to hospital.	
5. Do.	Do. Height, 4′—4¾″.	Left upper front chest between nipple and anterior axillary border; split, ⅝″×½″. Height, 3′—11½″.	From right to left and upwards.	Right lung, left auricle of heart. Left 3rd rib fractured.	..	Do.	Do.	
6. Left lower chest, 7th inter space nipple line.	Oval, ⅝″ × ½″. Height, 3′—4¾″.	(Operated on.)	..	Spleen surgically removed.	..	..	Hospital.	3 hrs.
7. Left back between left shoulder blade and the spine.	17 small round shot holes over a circle 3½″ in diameter.	..	From behind forwards.	Shot holes in both lungs, ascending aorta. Left 6th, 7th and 8th ribs fractured.	20 ozs.	Shot-gun.	On the spot.	

Twenty deaths were due to mixed injuries, consisting of bruises, lacerated wounds, stabs and cut wounds, situated on the head, trunk, and limbs. Of these 3 individuals had from 11 to 17 injuries a piece; 6 had from 6 to 10 injuries

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TABLE XV.

Gunshot wounds of the head. Total 4 cases.

Entry.	Height, character and size.	Exit.	Direction of fire.	Organs injured.	Nature of weapon.	Where died.	Duration of life.
1. Top fore-part of head over anterior fontanelle.	Crucial tear, 1½″ × ¾″. Height, 5′—4″.	Nil.	From above, downwards and to right.	Bullet lodged in right temporal lobe of brain.	Revolver.	Hospital.	3 hrs.
2. Right side fore-part of the head, 1″ behind the hair line.	Round hole, ¼″. Height, 5′—2½″.	Nil.	From before backwards.	Through right cerebral hemisphere: lodged just to right of cruciate eminence.	Do.	Do.	1 hr. 40 mins.
3. Left cheek.	Round, 5|16″. Height, 5′—3″.	Nil.	From before backwards and to the right.	Through base of brain: lodged in the right inferior occipital fossa.	Do.	On the way to hospital.	..
4. Left lower side of back of head.	Irregular, oblong, 1″ × ¾″.	Nil.	From behind, forwards.	Though left cerebral lobe and left base of brain as far as apex of petrous temporal bone.	Do.	Hospital.	..

TABLE XVI.

Mixed injuries. Total deaths 20.

Injuries of the head and number of injuries.	Nature of injuries.	Other associated injuries.	Injury of internal organs.	Internal bleeding.	Duration of life.
Varied from 3—7.	Bruises, lacerated wounds, cut wounds associated with fracture of the skull, 7.	Stab wounds of chest only, 3. Stab wounds of abodmen only, 4.	Penetrating left lung, 1 (A). Non-penetrating, 2 (B).	(A) Nil pleura fully adherent.	(A) 6 hours. (B) 19 and 42½ hours.
..	Do.	..	Liver, 1 (A). Kidney, 1 (B). Spleen, 1 (C). No organ injured, (D).	(A) Operated on. (B) 16 ozs. (C) 12 ozs. (D) 8 ozs.	(A) 2½ days. (B) Died in the street. (C) ¾ hour. (D) 6 hours.
..	Do.	Cut wound right loin, 1 (A). Cut wound lower jaw, 3 (B). Cut wound of neck muscles deep, 1 (C). Cut wounds arms and forearms, 3 (D). Cut wound, right thigh, femoral artery cut, 1 (E).	..	(A) Nil. (B) Nil. (C) Nil. (D) Nil. (E) Nil.	(A) Died in the street. (B) Average 12 hours. (C) 3½ hours. (D) ? (E) Died in the street.
..	Do.	Stab wounds neck and chest, 1 (A). Stab wounds neck and abdomen, 2 (B).	..	(A) Pleura adherent. (B) 7 ozs.	(A) In a short while. (B) 2 hours.
..	Do.	Stab wound, abdomen and fracture of all bones of face, (A).	..	(A) 12 ozs.	(A) Died in the street.

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apiece, whilst the other 11 cases showed from 2 to 5 injuries apiece. All had head injuries, varying from 3 to 7 in number. Details are shown in Table XVI.

THE ANÆMIA OF PREGNANCY. A STUDY OF FORTY-THREE CASES.

By S. A. McSWINEY, B.A., M.B., B.Ch., F.R.C.S.I., MAJOR, I.M.S.,

Late Resident Surgeon, Eden Hospital for Diseases of Women and Children, Calcutta: late Second Resident Surgeon, Presidency General Hospital, Calcutta.

THE anæmia of pregnancy is a condition about which so little is known that I am encouraged to publish my investigations into forty-three cases which came under my notice during the two and a half years when I was Resident Surgeon in the Eden Hospital, Calcutta.

Textbooks of obstetrics scarcely mention it; in the literature I can find only two references* and these unfortunately are not available in India. I propose, however, to study them while I am on leave in Europe and if any fresh light is found to have been thrown on the subject by these investigators I hope to publish synopses as a continuation of this article.

By the anæmia of pregnancy I mean a condition of anæmia for which no obvious cause can be found—such as hæmorrhage, malaria, kala-azar, ankylostomiasis, leukæmias, etc.; any case suggestive of these conditions was excluded from this group of cases.

Case No. 1.—Mrs. E., Jewess, 4th gravida; aged 25; admitted 11th June 1923. Hæmoglobin 30 per cent.; Red cells 2,000,000: confined 20th June 1923; child healthy, 6 lbs. 4 ozs. Wassermann reaction negative. Discharged 30th June 1923.

Case No. 2.—K., Hindu, aged 15, 1st gravida; admitted 6th July 1923. Hæmoglobin 35 per cent.; R.B.C.'s 2,500,000: confined 29th July 1923; child 2 lbs. 2 ozs., died soon after birth. Died 8th August 1923.

Case No. 3.—N. J. B., Mahomedan, 30 years, 8th gravida; admitted 24th July 1923. Hæmoglobin 25 per cent.; R.B.C.'s 1,500,000: confined 25th July 1923; child 5 lbs. 12 ozs., healthy. Discharged 4th August 1923.

Case No. 4.—Mrs. S., Anglo-Indian, 25 years, 5th gravida; admitted 9th August 1923. Hæmoglobin 20 per cent.; R.B.C.'s 1,250,000: confined before admission—still-born. Died 13th August 1923.

Case No. 5.—S., Hindu, 20 years, 2nd gravida; admitted 7th September 1923. Hæmoglobin 25 per cent.; R.B.C.'s 1,500,000: confined 7th September 1923; twins.

Twins:—3 lbs., alive, and 5 lbs., still-born. Discharged 19th September 1923.

Case No. 6.—Mrs. R., Anglo-Indian, 28 years, 7th gravida; admitted 21st October 1923. Hæmoglobin 24 per cent.; R.B.C.'s 840,000: confined 23rd October 1923; child 7 lbs., alive (but died 28th October 1923). Died 31st October 1923.

Case No. 7.—Mrs. G., Anglo-Indian, 22 years, 4th gravida; admitted 1st December 1923. Hæmoglobin 30 per cent.; R.B.C.'s 1,750,000: confined 1st December 1923; child 4 lbs., still-born. Died 12th December 1923.

Case No. 8.—S., Hindu, 20 years, 1st gravida; admitted 30th November 1923. Hæmoglobin 25 per cent.; R.B.C.'s 1,500,000: Wassermann reaction negative. Confined 30th November 1923; child 3 lbs., alive. Died 10th December 1923.

Case No. 9.—G., Hindu, 23 years, 2nd gravida; admitted 18th December 1923. Hæmoglobin 30 per cent.; R.B.C.'s 1,000,000: confined 19th December 1923; child 2 lbs., still-born. Died 19th December 1923.

Case No. 10.—K. P. B., Hindu, 18 years, 1st gravida; admitted 23rd December 1923. Hæmoglobin 15 per cent.; R.B.C.'s 1,000,000: confined 24th December 1923; child 5 lbs., still-born. Died 28th December 1923.

Case No. 11.—R., Hindu, 35 years, 1st gravida; admitted 10th January 1924. Hæmoglobin 30 per cent.; R.B.C.'s 1,750,000: confined 10th January 1924; child 4¾ lbs., alive. Died 13th January 1924.

Case No. 12.—Mrs. D.'C., Anglo-Indian, 22 years, 2nd gravida; admitted 24th January 1924. Hæmoglobin 30 per cent.; R.B.C.'s 1,000,000: Wassermann reaction negative; confined 25th January 1924; baby 6 lbs., alive. Left against advice 8th February 1924.

Case No. 13.—Mrs. O., Anglo-Indian, 24 years, 6th gravida; admitted 11th February 1924. Hæmoglobin 30 per cent.; R.B.C.'s 2,000,000: confined 20th February 1924; fœtus 1 lb. 14 ozs., died soon after birth. Discharged 3rd May 1924.

Case No. 14.—Mrs. B., Anglo-Indian, 23 years, 6th gravida; admitted 19th July 1924. Hæmoglobin 40 per cent.; R.B.C.'s 3,000,000: confined 19th July 1924; child 4 lbs., 7 ozs., alive. Discharged 26th August 1924.

Case No. 15.—C. D., Hindu, 19 years, 3rd gravida; admitted 27th July 1924. Hæmoglobin 35 per cent.; R.B.C.'s 1,500,000: confined 30th July 1924; fœtus 1 lb. 4 ozs., dead. Died 30th July 1924.

Case No. 16.—N., Hindu, 22 years, 3rd gravida; admitted 4th August 1924. Hæmoglobin 12 per cent.; R.B.C.'s 500,000: confined 24th August 1924; child 4 lbs. 6¼ ozs., dead. Died 25th August 1924.

Case No. 17.—S., Hindu, 40 years, 8th gravida; admitted 17th September 1924. Hæmoglobin 30 per cent.; R.B.C.'s 1,500,000: confined 17th September 1924; fœtus 3¾ lbs., still-born. Left hospital against advice 29th September 1924.

Case No. 18.—T., Hindu, 25 years, 1st gravida; admitted 23rd September 1924. Hæmoglobin 15 per cent.; R.B.C.'s 500,000. Wassermann reaction strongly positive. Died 26th September 1924—not confined.

Case No. 19.—H., Hindu, 21 years, 2nd gravida; admitted 10th October 1924. Hæmoglobin 50 per cent.; R.B.C.'s 1,050,000. Wassermann reaction negative. Confined 24th October 1924; child 4 lbs. 13 ozs., alive. Discharged 1st November 1924.

Case No. 20.—Mrs. E., Anglo-Indian, 26 years, 6th gravida; admitted 23rd October 1924. Hæmoglobin 40 per cent.; R.B.C.'s 2,750,000: confined 24th October 1924; fœtus 3 lbs. 8¾ ozs., died after a few hours. Left hospital against advice 3rd November 1924.

Case No. 21.—A., Hindu, 30 years, 5th gravida; admitted 1st November 1924. Hæmoglobin 20 per cent.; R.B.C.'s 1,000,000: confined before admission, still-born. Discharged 18th November 1924.

Case No. 22.—Mrs. B. S., Indian Christian, 30 years, 4th gravida; admitted 3rd November 1924. Hæmoglobin 50 per cent.; R.B.C.'s 3,000,000. Wassermann reaction negative. Confined 18th November 1924; child 4 lbs. 5½ ozs., alive. Discharged 28th December 1924.

Case No. 23.—Mrs. P. S., Anglo-Indian, 24 years, 2nd gravida; admitted 3rd November 1924. Hæmoglobin 40 per cent.; R.B.C.'s 2,750,000: confined 3rd November 1924; fœtus 5 lbs. 1½ ozs., alive. Left hospital against advice 7th November 1924.

Case No. 24.—S., Hindu, 20 years, 4th gravida; admitted 4th November 1924. Hæmoglobin 25 per cent.; R.B.C.'s 1,300,000. Wassermann reaction strongly positive. Confined 4th November 1924; fœtus 2 lbs. 12¾ ozs., still-born. Discharged 29th December 1924.

Case No. 25.—K., Hindu, 32 years, 3rd gravida; admitted 22nd November 1924. Hæmoglobin 18 per cent.; R.B.C.'s 1,000,000. Wassermann reaction negative. Confined 25th November 1924; fœtus 13 ozs. Discharged 20th December 1924.

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* Paterson.—*Arch. Mens. d'obst. et de Gyn.*, 1918, Vol. VII, 1—21.
Esch.—*Zentralbl. f. Gyn.*, 1921, 341—345.

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Case No. 26.—N., Hindu, 22 years, 1st gravida; admitted 28th November 1924. Hæmoglobin 35 per cent.; R.B.C.'s 1,750,000: confined 28th November 1924; fœtus 2 lbs., macerated. Died 6th December 1924.

Case No. 27.—Mrs. E., Jewess, 25 years, 3rd gravida; admitted 1st December 1924. Hæmoglobin 30 per cent.; R.B.C.'s 1,500,000: confined 25th December 1924; fœtus 4 lbs. 8½ ozs., alive. Discharged 7th January 1925.

Case No. 28.—K., Hindu, 19 years, 2nd gravida; admitted 3rd December 1924. Hæmoglobin 35 per cent.; R.B.C.'s 1,750,000. Wassermann reaction negative. Confined 3rd December 1924; fœtus 3 lbs. 3½ ozs. (died in 7 days). Left hospital against advice 12th January 1925.

Case No. 29.—Mrs. A. P., Indian Christian, 23 years, 3rd gravida; admitted 9th December 1924. Hæmoglobin 30 per cent.; R.B.C.'s 1,750,000. Confined 11th December 1924; fœtus 3 lbs., still-born. Died 16th December 1924.

Case No. 30.—T. B. D., Hindu, 17 years, 3rd gravida; admitted 18th December 1924. Hæmoglobin 25 per cent.; R.B.C.'s 1,250,000. Wassermann reaction negative. Confined 19th December 1924; fœtus 1½ lbs., still-born. Discharged 3rd January 1925.

Case No. 31.—M. B., Mahomedan, 25 years, 1st gravida; admitted 27th December 1924. Hæmoglobin 30 per cent.; R.B.C.'s 1,350,000. Wassermann reaction negative. Confined 13th January 1925; fœtus 2 lbs. 10 ozs., still-born. Discharged 14th March 1925.

Case No. 32.—K., Hindu, 25 years, 2nd gravida; admitted 12th January 1925. Hæmoglobin 30 per cent.; R.B.C.'s 1,500,000. Wassermann reaction moderately positive. Confined 15th January 1925; fœtus 3 lbs. 1½ ozs., alive. Discharged 8th March 1925.

Case No. 33.—S., Hindu, 18 years, 1st gravida; admitted 22nd February 1925. Hæmoglobin 50 per cent.; R.B.C.'s 2,000,000: confined 22nd February 1925; fœtus 5 lbs. 8 ozs., alive. Discharged 23rd March 1925.

Case No. 34.—L., Hindu, 24 years, 1st gravida; admitted 12th March 1925. Hæmoglobin 35 per cent.; R.B.C.'s 2,250,000. Wassermann reaction moderately positive. Confined 13th March 1925; fœtus 4 lbs. 10 ozs., alive. Discharged 3rd April 1925.

Case No. 35.—Mrs. McN., Anglo-Indian, 39 years, 4th gravida; admitted 18th June 1925. Hæmoglobin 45 per cent.; R.B.C.'s 2,000,000. Wassermann reaction negative. Confined 24th June 1925: twins, 5 lbs. 15 ozs., alive; 4 lbs. 8 ozs., alive. Discharged 17th August 1925.

Case No. 36.—D., Hindu, 26 years, 1st gravida; admitted 29th June 1925. Hæmoglobin 30 per cent.; R.B.C.'s 2,000,000: confined 30th June 1925. Twins 1 lb. 5 ozs., still-born; 1 lb. 2 ozs., still-born. Discharged 20th July 1925.

Case No. 37.—C., Hindu, 23 years, 1st gravida; admitted 29th June 1925. Hæmoglobin 35 per cent.; R.B.C.'s 1,700,000. Wassermann reaction strongly positive. Confined 2nd July 1925; fœtus 2 lbs. 9½ ozs., alive. Discharged 14th August 1925.

Case No. 38.—S., Hindu, 18 years, 2nd gravida; admitted 14th July 1925. Hæmoglobin 30 per cent.; R.B.C.'s 2,000,000. Wassermann reaction strongly positive. Left against advice unconfined 8th August 1925.

Case No. 39.—(This is Case No. 14 in her next pregnancy). Mrs. B., Anglo-Indian, 24 years, 7th gravida; admitted 3rd August 1925. Hæmoglobin 35 per cent.; R.B.C.'s 2,000,000. Wassermann reaction doubtful. Confined 4th August 1925; fœtus 4 lbs. 10 ozs., healthy. Died 9th August 1925.

Case No. 40.—K., Hindu, 25 years, 2nd gravida; admitted 4th September 1925. Hæmoglobin 45 per cent.; R.B.C.'s 2,500,000. Wassermann reaction moderately positive. Confined 4th September 1925; fœtus 2 lbs. 6 ozs., still-born. Left hospital against advice 13th September 1925.

Case No. 41.—K., Hindu, 18 years, 1st gravida; admitted 8th September 1925. Hæmoglobin 35 per cent.; R.B.C.'s 1,750,000. Wassermann reaction moderately positive. Confined 9th September 1925; fœtus 3 lbs. 10 ozs., alive. Died 18th September 1925.

Case No. 42.—R., Hindu, 22 years, 2nd gravida; admitted 10th September 1925. Hæmoglobin 55 per cent.; R.B.C.'s 2,500,000. Wassermann reaction doubtful. Confined 15th October 1925; fœtus 3 lbs. 14 ozs., alive. Discharged at own request 2nd November 1925.

Case No. 43.—Mrs. C., Anglo-Indian, 20 years, 1st gravida; admitted 30th September 1925. Hæmoglobin 35 per cent.; R.B.C.'s 2,000,000: confined 30th September 1925; fœtus 3½ lbs., alive. Discharged 20th October 1925.

Incidence.

These cases occurred between the 1st June 1923 and 30th September 1925. During that time 2,544 maternity cases were admitted, so that the incidence works out at 1·69 per cent.

Without having actual figures for the purpose of comparison it is not safe to dogmatise, but one's own impression is that the disease is much commoner in Calcutta than in England. Perhaps your correspondents will inform us as to its prevalence in other parts of India.

In addition to the 43 cases which form the subject of this article, there were two others who died within 24 hours of admission and before a blood examination was made: the notes mention "profound anæmia" in each case. One admitted 11th November, 1923, had a dead fœtus of 5½ lbs., and the other admitted 11th November, 1924, of 4 lbs. 6 ozs.

Race:

Of the 43 cases,

Anglo-Indians	were 11	or 25·58	per cent.
Jews	were 2	or 4·65	per cent.
Hindus	were 26	or 60·46	per cent.
Mahomedans	were 2	or 4·65	per cent.
Indian Christians	were 2	or 4·65	per cent.

Mortality:

Maternal	.. 15	or 34·88	per cent.
Fœtal	.. 24	or 55·81	per cent.

This fœtal mortality includes 1½ sets of twins and all the fœtuses, whether viable or not, which were either still-born or died before leaving the hospital.

Parity:

Primiparæ	were 13	or 30·23	per cent.
2nd paræ	,, 10	or 23·25	per cent.
3rd paræ	,, 6	or 13·95	per cent.
4th paræ	,, 5	or 11·63	per cent.
5th paræ	,, 2	or 4·65	per cent.
6th paræ	,, 3	or 6·97	per cent.
7th paræ	,, 2	or 4·65	per cent.
8th paræ	,, 2	or 4·65	per cent.

These figures show that the condition is much commoner in the early pregnancies than in the later ones; the figures for age confirm this.

Age:

Under 30 years	.. 36	or 83·72	per cent.
30 years and over	7	or 16·28	per cent.
Under 25 years	.. 26	or 60·46	
25 years and over	17	or 39·54	

The condition is therefore five times more common under the age of 30 than over it, and

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one and a half times more common under the age of 25 than over 25.

Multiple pregnancy:

Three out of the 43 cases were twins or 6·97 per cent. of the total, i.e., more than five times the usual incidence of twins. Multiple pregnancy is therefore amongst the possible predisposing causes.

Spleen:

Could not be felt in 33 cases or 76·74 per cent.
Was palpable in 7 cases or 16·28 per cent.
Greatly enlarged in 3 cases or 6·98 per cent.

Liver:

Could not be felt in 38 cases or 88·37 per cent.
Was palpable in 5 cases or 11·62 per cent.

The Blood.

The profundity of the anæmia in extreme cases is shown by Case 16, in which the hæmoglobin was 12 per cent. and the R. B. C.'s 500,000, and Case 18, in which the figures were 15 per cent. and 500,000. As might be expected, both of these patients died.

Abnormal red cells—poikilocytes, normoblasts, and megaloblasts—occurred in the graver cases as a rule, but Case 41 did not show any.

The total white cell count did not show any striking variation. It was used with the formaldehyde test to exclude kala-azar.

A differential leucocyte count was not done in every case owing to pressure of work: where it was done there was a relative increase of the lymphocytes.

The blood examinations were carried out under the direction of Major G. Shanks, I.M.S., Professor of Pathology, Medical College, Calcutta, and by the Clinical Pathologist to the Eden Hospital, Dr. Gupta, to both of whom my best thanks are due.

Urine.

There was no albumen in the urine in 17 cases: the notes state that it was markedly present in 5 cases, and present in 21. Casts may or may not be present.

Œdema.

Œdema of the feet and puffiness of the face are common: a general puffiness of the whole body occurred in 14 cases, in 3 of which no albumen was found in the urine.

Tendency toward miscarriage and premature labour.

There was only one fœtus weighing 7 lbs. (Case 6), only three weighing 6 lbs. or over (Cases 1, 6, 12), and only ten weighing 5 lbs. and over. We may conclude therefore that it is very unusual for a case to go to full term.

On the other hand, no case aborted (i.e., in the first three months of pregnancy), the smallest fœtus weighing 13 ozs. (Case 25). It was not until the second half of pregnancy that the patients were compelled by the gravity of the disease to seek admission. As none of these cases attended the ante-natal clinic before their admission, it is not possible to state the period of pregnancy at which the condition became noticeable.

The conclusion may, therefore, be drawn that, while there is no tendency to abortion (perhaps because the anæmia is not sufficiently advanced), there is a very marked tendency to miscarriage and premature labour.

Post-partum Hæmorrhage.

Contrary to what might be expected, there is no tendency to this: in fact the patients seemed to have particularly bloodless labours. There is obviously no weakening of the powers of contraction and retraction of the uterus. In only one case (No. 13) is there a note of post-partum hæmorrhage and this was due to a partially adherent placenta.

Investigation.

The common causes of anæmia readily occur to one, e.g., malaria, kala-azar, ankylostomiasis, tuberculosis, cancer, etc. In none of the above 43 cases was there any evidence of these diseases. I wish to draw attention to another well-known cause which may easily be overlooked in this connection, i.e., syphilis. The protean nature of the manifestations of this disease should not be forgotten, especially as it simulates certain conditions very closely. As an example, the following may be of interest. On one occasion in the Punjab the writer was handed over the charge of a man who was clinically a case of malaria, but who did not react to quinine and was slowly getting worse. He was having irregular, intermittent fever; he was somewhat anæmic and his spleen was palpable. Venereal disease was denied. No malarial parasites had been found and clinical and laboratory examinations failed to throw any light on the diagnosis. After some days of puzzling over the case, I thought of syphilis. The Wassermann reaction proved strongly positive, and the effect of treatment was magical.

I regret very much that the blood of all these cases was not sent for the Wassermann reaction. The reaction was done in 20 cases and out of these 8 were positive, i.e., 40 per cent., and 2 were doubtful, i.e., 10 per cent. It appears significant to me that in the year 1925 when I personally endeavoured to have the Wassermann reaction done in every case (it was actually done in 9 out of the 12 cases of that year) six out of nine reactions were positive, that is 66·6 per cent.; and two others were doubtful.

I have to thank Major R. B. Lloyd, I.M.S., Imperial Serologist, and his assistant for kindly carrying out these reactions.

Treatment.

I. Iron and arsenic should of course be administered either orally or by injection.

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II. Plenty of nourishing food, fresh air and sunshine are indicated.

III. Whole blood transfusion or intramuscular injections of whole blood.

(*a*) Whole blood transfusion. I think I am correct in stating that this may be a very dangerous weapon in grave anæmia. Within the last year I assisted a colleague to transfuse an advanced case of pernicious anæmia. The most elaborate care had been taken to secure a suitable donor. The only result was instant and dramatic disaster. Blood transfusion was not carried out in any of the cases recorded above.

(*b*) Intramuscular injections of whole blood in doses of 15 to 20 c.c. weekly were given in 3 cases with very encouraging results. It would be interesting to try the effect of this treatment at an early stage of the disease and see whether the anæmia could be successfully combated during the remainder of the pregnancy.

IV. Specific treatment for cases with a positive Wassermann reaction.

The results of these cases were extremely gratifying: the routine treatment was Mist. Hydrarg. Biniodide and intramuscular injections of Sulfarsenol.

Examples are:—

Case.	W. R.	On admission.	After Treatment.	Period of treatment
24	Strongly positive	H'bin 25% R.B.C. 1,300,000.	H'bin 50% R.B.C. 2,750,000	5 weeks.
32	Moderately positive	H'bin 30% R.B C. 1,500,000	H'bin 60% R.B.C. 2,700,000	8 weeks.
37	Strongly positive	H'bin 35% R.B.C. 1,700,000	H'bin 59% R.B.C. 2,200,000	6 weeks

It was not possible to follow up these patients. They were all poor and ignorant folk who became restless after some weeks of improvement, bitterly resented the innumerable injections and demanded their discharge at the earliest moment.

V. Termination of the pregnancy.

This should be carefully considered before the disease has progressed too far; otherwise disaster to mother or fœtus or both will have to be faced. In 7 cases the mother died within one week of admission; five of the seven had either still-born babies or miscarriages. The maternal mortality of 34·88 per cent., when no interference was carried out, obviously could be very greatly improved. My belief now, after considering these cases, is that we might possibly have saved one or two cases—late as they were—if we had terminated the pregnancy at once.

As to the method of terminating the pregnancy, slow and gentle methods of induction would be the choice of adoption, as anything in the nature of rapid evacuation would, in my opinion, lead to disaster.

I recommend termination of the pregnancy because there is a natural tendency to recovery after delivery. Most of the cases are marked "improved" or "much improved" on discharge, and some of the results were extremely gratifying; for example:—

Case 25 :—24-11-24. H'bin 18%. R.B.Cs. 1,000,000.
Confined 25-11-24. W.R. negative.
On 19-12-24. H'bin 50%. R.B.Cs. 3,000,000
Case 31 :—On 29-12-24. H'bin 30%. R.B.Cs. 1,350,000.
Confined 13-1-25. W.R. negative.
On 12-3-25. H'bin 60%. R.B.Cs. 3,000,000.

(Both these cases were treated with intramuscular injections of whole blood.)

VI. The possible effects of a succeeding pregnancy remain to be considered. I saw only one case in successive pregnancies. This was Case 14 when she had a live baby of 4 lbs. 7 ozs., hæmoglobin 40 per cent. and R. B. Cs. 3,000,000 and was discharged improved. She returned just one year later (Case 39): hæmoglobin 35 per cent.; R. B. Cs. 2,000,000; had a live baby of 4 lbs. 10 ozs. and died five days later.

One case is not enough from which to draw conclusions, but I believe the best advice would be to warn the patient against another pregnancy.

Discussion.

It is scarcely necessary to remind the reader that there is no direct communication between the maternal and fœtal circulations. One of the most striking things in these cases is to see a pale anæmic mother giving birth to a child of excellent colour with an apparently normal hæmoglobin index and red cell count. The fœtus makes its own blood: to do so it requires a rich supply of iron for the manufacture of its hæmoglobin. As no iron is present in the mother's plasma, it is believed that the chorionic villi break down the mother's red cells and hæmoglobin and that the products of the destruction of the latter are absorbed and rebuilt for the red blood cells of the fœtus.

This leads us to theories as to the cause of anæmia of pregnancy.

1. It has been suggested that the mother's restorative power necessary to counterbalance the normal destruction of her red cells is inadequate.

2. I suggest that some cases may be due to the destructive action of the chorionic villi on the mother's red cells, running riot as it were, comparable to the destructive action of the syncytium running riot in chorion carcinoma.

Either theory accounts for the natural tendency to recovery after removal of the fœtus.

3. A very large number are due to concealed syphilis.

In conclusion, I have to thank Lieutenant-Colonel V. B. Green-Armytage, I.M.S., First Professor of Midwifery, Medical College, Calcutta, for permission to publish these cases.

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THE ANÆMIA OF PREGNANCY.

(An enquiry carried out under the auspices of the Indian Research Fund Association.)

By MARGARET I. BALFOUR, C.B.E., M.B.,

From the Haffkine Institute, Bombay.

IT has long been known but severe anæmias occur during pregnancy, but it is only since the beginning of the present century that a distinction has been made between the anæmia of pregnancy and ordinary pernicious anæmia. The main points which indicate the difference in the former are the shorter duration, the absence of marked remissions and exacerbations and the frequently favourable termination when the pregnancy is ended.

The disease is rare in the United Kingdom but it is known to exist. In 12,000 cases reported from the Rotunda Hospital, Dublin, 1921-23, one case was included. In 1,800 cases reported from Queen Charlotte's Hospital, London, 1923, one case was included, while among 1,600 cases reported from the Simpson Memorial Hospital, Edinburgh during 1923, not a single case occurred.

Modern medical literature refers to the disease with increasing frequency. Esch, writing in 1917, published 23 collected cases: (1) Osler in 1919 contributed a paper classifying the different anæmias of pregnancy and the puerperium, (2) Bardy in 1924 published 68 cases collected over a period of 38 years from the medical literature of Europe and the United States. (3) Larrabee in 1925 published a valuable paper especially dealing with the etiology of the disease (4), and from time to time cases are published in the medical periodicals of all countries. While many theories as to the etiology have been advanced, none up to the present have been accepted as proved.

In view of the frequency with which the disease occurs in India, it is surprising how little attention it has attracted. This is no doubt partly owing to the fact that little obstetric practice is in the hands of medical practitioners. Among those who see much of obstetrics, however, the disease is known and dreaded.

In 1925 I sent out a questionnaire to a number of maternity hospitals and wards in different parts of India and received particulars of 426 cases of anæmia of pregnancy from all parts of the country. These appear from the clinical symptoms to be of the same type as the cases which I have followed up personally in Bombay, but details of pathological examination have not usually been available. In the remarks which follow, therefore, I am dealing only with the Bombay cases, 150 in number, and which were seen between October 1925 and April 1927. The fact, however, that I received information regarding so many cases from other parts of the country (although only a moiety no doubt of those that actually occurred) shows the great importance of this subject.

The following cases were seen at the Allbless, Bai Motlibai and Wadia Hospitals and I must express my indebtedness to the Superintendents of these hospitals for the facilities for research so kindly given.

History and Onset.

It is notoriously difficult to get a correct history from hospital patients in India and this makes it all the more remarkable that in over half the cases a definite history of sudden onset when in previous good health was given, usually between the 5th and 7th months of pregnancy. In 16 cases a history of bad health from the beginning of pregnancy was given, and in 6 cases a history of somewhat similar symptoms in a previous pregnancy. In the remaining cases the history of the onset was indistinct.

In 75 cases the disease began with fever sometimes described as severe. This was often stated to have lasted for 15 days or a shorter period with rigors, and to have then ceased. In these cases there was no diarrhœa.

In 58 cases diarrhœa was a marked feature with or without fever, and in 17 cases the patients denied having had either fever or diarrhœa and stated that the only trouble had been œdema and increasing weakness.

Pyrexia.—125 patients or 83·3 per cent. suffered from raised temperature at one time or other, a rise in temperature on the 2nd or 3rd day after delivery being common. Some cases, had they not been seen during pregnancy, might have been taken for sepsis. *Albuminuria* was present in 38 per cent. *Enlargement of the liver* was present in 8 per cent.

Enlargement of the Spleen in 18 per cent.

Œdema was present in every case, usually accompanied by some puffiness and swelling about the face.

Diarrhœa was present in 38 per cent. Sometimes it was the most prominent symptom; at others it was only present for a few days. The motions were usually watery and free, with no tendency to frothiness or excessive fatty matter and only rarely showing mucus or blood.

Vomiting (other than the physiological vomiting of pregnancy) was present in 40 per cent.

Sore tongue was present in 31 per cent. The lesion usually consisted of red patches at the margin or on the surface of the tongue, with occasional enlargement of the papillæ. Sometimes the whole surface of the tongue was red and raw. Patients frequently complained of burning sensations passing down the fauces.

Epistaxis occurred in 7 cases, and severe bleeding from the gums in one case.

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Weakness was always complained of, but was not so marked as the extreme anæmia would lead one to expect. The patients were usually fairly well nourished and some retained their appetites and power of digestion.

Pulse invariably rapid.

Age.—61·2 per cent. were between 20 and 30 years of age, 22·6 per cent. were between 30 and 40, 2·6 per cent. were over 40 and 13·6 per cent. were under 20.

Previous labours.—29 per cent. were primiparæ, 22 per cent. were 2 paræ, 13 per cent. 3 paræ, 7 per cent. 4 paræ, 9 per cent. 5 paræ, 3 per cent. 6 paræ, 14 per cent. over 6 paræ. Two were at their 12th deliveries.

Course and termination.—Patients usually entered hospital in a severe condition of anæmia after a month or 6 weeks illness. Under treatment—rest in bed, good diet, injections of iron and arsenic—they sometimes improved and 8 were discharged before delivery, not cured but improved. Frequently no improvement took place. Delivery was usually premature: 42 per cent. of mothers died and 53 per cent. of infants were still-born while another 15·3 per cent. of infants died a day or two after birth. In 20 fatal cases where a clear history was given, an average period of 56 days had elapsed between the first onset of symptoms and death. In the 63 deaths which took place, 6 mothers died undelivered, 24 died within 24 hours of delivery, 9 between the second day and end of 1st week, 14 between the 2nd and 4th weeks, and 7 after 4 weeks. The longest period after delivery was 4 months and 7 days.

The non-fatal cases sometimes recovered rapidly after delivery and were almost normal on discharge. In other cases, the anæmia lingered and many were still seriously anæmic on discharge, although they insisted on going home. As many as possible have been followed up and occasional blood examinations have been made. Of 46 cases discharged during the winter of 1925-26, 10 are under observation. These are all well and the blood picture is practically normal. Four have again become pregnant and one has been delivered of a healthy baby. Of the more recent cases, 43 are under observation. Even those who were very anæmic on discharge from hospital are found to be nearly normal in 6 months time, though sometimes complaining of slight debility. Of 57 patients seen during the winter of 1925-26, 21 have been lost sight of and of the remaining 36 only 4 of their babies survive.

The diarrhœic cases were more fatal than the non-diarrhœic. Of 75 who had fever, but no diarrhœa, 33 per cent. died, while of 58 where diarrhœa was present, 53 per cent. died. Diarrhœa, however, rarely supervened in the later stages of the disease. A patient who began as a non-diarrhœic case continued so.

Communities affected.

The question of the comparative incidence in different communities is interesting. In the series of 150 cases now under observation, the numbers were as follows:—Brahmins 4, other Hindus 55, Mahommedans 52, Christians 29, Jews 7, Parsis 3. Considering the great preponderance of the Hindu community in Bombay, their proportion of anæmia is small. In order to make sure that this is due to lesser susceptibility, I compared these numbers with the number of cases of each community confined at the principal maternity hospitals in Bombay during a period of 9 months. I found that 10·2 per cent. of the Mahommedan mothers were affected with anæmia as compared with 4·1 per cent. of Hindu mothers and 4·4 per cent. of Christian mothers. I then ascertained by reference to the total births for each community in Bombay City that the proportion of Hindu and Mahommedan women delivered in hospital is nearly the same in both communities, that in the Mahommedan community being slightly higher, hence the above figures are not affected by any great excess of normal cases in either community. This makes it clear that the anæmia of pregnancy is more common among Mahommedans, but there are indications that the same remark applies to the other diseases of pregnancy, such as osteomalacia and eclampsia. The main cause of this is probably the *purdah* conditions under which most Mahommedan women live. The poorer classes are confined in a single room where they lead a very inactive life. Hindu women, though under the same general conditions as regards poverty, overcrowding and epidemics, do not observe *purdah* in Bombay and so have a freer life.

I have visited a number of the patients in their homes and have made some observations as regards social position and surroundings. The patients were not entirely or even chiefly of the poorest classes. Many were the wives of clerks, shop-keepers and merchants and could afford good diet and lived in fairly comfortable houses. Some were found to be living in flats with several rooms, airy and well ventilated. These rooms were usually clean and well kept. Others lived in one room and sometimes more than one family shared the room. Several of these were very dark and airless. Some lived in huts allowing plenty of ventilation, in open localities.

As regards diet, Mahommedans of course are meat eaters. Most of the Hindus were also meat eaters, only 25 per cent. of the total cases being vegetarians. Probably, however, Hindus take less meat than Mahommedans.

The lives of all were more or less confined and inactive, those of the Mahommedans more so than of the Hindus as they were not permitted to leave their houses unless for special occasions and then enveloped in a *burhka.*

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The Hindu women did not go out much, because custom and habit did not encourage it. The work of the home does not require a great deal of activity, especially if it is shared by several women. Modern conveniences also tend to reduce domestic duties, while modern principles regarding physical exercises and games for women have not yet taken root in India except in a few cases. A generation ago the women of the family ground the corn daily and fetched water from the well. Now in Bombay at least, they buy the corn ready ground in the bazaar and the pipes bring the water to their doors.

It was noticed that few cases of anæmia occurred among women industrial workers.

A spot map was prepared with a view to finding if any parts of the city were more affected than others. Very many cases were seen to occur in B ward where most of the Mahommedans live. The cases for the different wards were compared with the births for each ward and it was found that B ward had double the ratio of any other ward. Next came C ward, then A and D wards. E ward had fewer cases and F and G wards least of all.

There are two facts which may help to explain this. F and G wards take up the whole northern half of the island of Bombay. Hence they are infinitely less crowded than the central and southern parts of the city. The population per acre varies from 15·86 to 107·25 in these two wards, as compared with 305·82 to 736·86 for C ward. The people in F and G wards are largely mill-workers and although only a small proportion of the women work in the mills, the whole class no doubt live a freer and more open air life than those in the crowded parts of the city.

Seasonal variation.

The disease tended to be seasonal in that the majority of the cases occurred during the second half of the year. This is not to be explained by the seasonal variation of the birth-rate as will be seen by reference to the table below. This shows the births for the city of Bombay during 1926 according to months, with the cases of pregnancy anæmia which occurred in the two main maternity hospitals for the same periods and their respective monthly percentages. From this it will be seen that the variation in the numbers of anæmia cases was much greater than of the births.

A closer examination shows that the seasonal incidence of the anæmia depends principally on the diarrhœic cases. During the year 1926 of 40 non-diarrhœic cases, 18 were in the first half and 22 in the second half of the year. Of 44 diarrhœic cases, 11 were in the first half and 33 in the second half of the year. There is evidently some factor in the second half of the year which favours the onset of diarrhœa.

Comparison of monthly incidence of anæmia of pregnancy with monthly births during 1926.

Months.	Births.*	Percentage.	Anæmia percentage.
January ..	1,809	8.58	10
February ..	1,534	7.28	7
March ..	1,561	7.40	13
April ..	1,620	7.68	5
May ..	1,639	7.77	2
June ..	1,474	6.99	1
July ..	1,624	7.70	5
August ..	1,790	8.49	6
September ..	1,849	8.77	10
October ..	2,158	10.24	9
November ..	2,012	9.55	14
December ..	1,998	9.48	18

* Kindly supplied by the Executive Health Officer, Bombay.

Examination of blood.

The blood picture showed few variations and the following is the average of 25 consecutive cases:—

Red blood cells ..	1,210,000 per c.mm.
Hæmoglobin ..	33 per cent.
Colour index ..	1·4 per cent.
Leucocytes ..	8,416 per c.mm.
Polymorphs ..	57·1 per cent.
Lymphocytes ..	38·66 per cent.
Mononuclears ..	3·5 per cent.
Eosinophiles ..	0·8 per cent.

Poikilocytosis was present in 13 cases, anisocytosis and polychromatophilia in 24, achromia in 23, malarial parasites in 1, normoblasts in 16, megaloblasts in 11. The red cells varied from a maximum of 2,830,000 to a minimum of 500,000, and the leucocytes from a maximum of 32,000 to a minimum of 3,200. Blood platelets were absent or scanty.

The child's blood was found to be normal whenever examined.

In 13 cases in which the blood was cultured it was found to be sterile in 11. In 1 case streptococci (non-hæmolytic) were present, and in 1 case Gram-negative bacilli.

Kahn's test for syphilis was done in 32 cases, of which 15 were positive and 17 were negative.

Blood grouping of mother and child was investigated in 36 cases. The maternal and the fœtal bloods were in the same group in 10 cases and in different groups in 26 cases, as compared with 17 normal pregnancy controls where the bloods were in the same groups in 12 cases and in different groups in 5 cases only.

Examination of urine.

Of 107 cases examined for albumen, 52 were positive, 55 were negative. Of 150 cases bacteriologically examined, 37 were sterile; in

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the remainder the following organisms were present:—

B. alkaligenes	.. ..	23 cases.
B. pyocyaneus	.. ..	18 ,,
Streptococci	.. ..	7 ,,
Staphylococci	.. ..	5 ,,
Coliform organisms	..	32 ,,
Gram-negative organism not identified further	..	28 ,,

The urine was examined in 41 cases of normal pregnancy and of these 32 were found to be sterile. Of the remainder, 6 contained *B. alkaligenes*, 2 Gram-negative organisms and 1 *B. aerogenes*.

Examination of fæces.

Fæces were examined for worm ova in all cases where there was eosinophilia. In 5 cases, the ova of roundworms were present, in 1 case those of whipworm and in 1 case those of hookworm. The last is rare in Bombay.

Recently fæces have been examined for *B. Welchii*. Out of 4 cases examined, *B. Welchii* has been found in unusual numbers in 2 cases.

Post-mortem findings.

Unfortunately, on account of religious and caste prejudices, it is difficult to get post-mortems and it has so far been possible in only 2 cases.

Case No. 1.—R. M., Christian, age 22, 2 para. Unfortunately this patient was not seen until shortly before her death. She entered hospital on the 13th day after delivery with a history of fever since delivery. The lochia were not offensive. The blood examination was as follows—red cells 950,000, Hb. 42 per cent., C. I. 2, polymorphs 57 per cent., lymphocytes 28 per cent., mononuclears 15 per cent. She gradually sank and died one month after admission.

At the post-mortem examination, evidences of old tuberculous changes were found in one lung with some more recent changes.

Spleen.—Slightly enlarged. Under the microscope, pulp cells were seen to be scarce, the lymphoid tissue thin and scattered. Interstices were filled with red cells which appeared pale and degenerated. A very large amount of fine and coarse golden pigment throughout the section.

The liver and spleen on being treated with ferrocyanide of potassium solution gave a marked Prussian blue reaction.

Kidney.—Under the microscope, the epithelium was disintegrated (probably post-mortem change), but the glomeruli, Bowman's capsule and the vessels were normal.

Bone marrow.—Large areas were aplastic and the nucleated red cells were few in number. Large megaloblastic cells and some eosinophile myelocytes were seen. The cell outlines were hazy (post-mortem) and nuclei were not sharp.

Case No. 2.—Mrs. A., age 33, Christian, 8 para. During last pregnancy suffered from diarrhœa, and fever before delivery. The child was still-born and she was laid up for 3 months after. She then went for a change and returned in July quite well. She became pregnant again in August. She had slight vomiting which ceased at the 3rd month. She continued well until the beginning of the 7th month when vomiting returned and occasional slight fever occurred. She was much troubled with constipation and indigestion and entered hospital at the beginning of the 9th month. She was severely anæmic, with œdema of the feet and puffiness of the face, no enlargement of the liver or spleen, no albuminuria. The tongue was raw and painful, teeth clean and well kept but several carious.

Blood examination.—Red blood cells 1,410,000 per c.mm., hæmoglobin 37 per cent., colour index 1.3, leucocytes 3,800 per c.mm., polymorphs 58 per cent., lymphocytes 42 per cent., anisocytosis and polychromatophilia, a few blood platelets, a few normoblasts and megaloblasts.

The urine contained streptococci, which were also found in pus from the gums.

The fæces contained no worm ova but an abundance of *B. Welchii*.

Kahn's test for syphilis negative.

No improvement took place. Patient went into labour 10 days after admission and died on the 3rd May. The child which weighed 4 lbs. also died.

At the post-mortem examination all the organs were found to be very pale. The spleen was slightly enlarged. No naked eye changes were seen in the intestine except possible slight thinning of the wall in parts. The liver and spleen on being treated with ferrocyanide of potassium solution gave a strong Prussian blue reaction.

Under the microscope:—

Intestine.—A well marked area of coagulation necrosis and destruction of tissue cells over this area (may be auto-digestion).

Spleen.—More normal splenic pulp than in previous section (R. M.), but numbers of effete red blood cells undergoing destruction and a quantity of deep golden brown fine and coarse pigment scattered throughout the organ.

Kidney.—Disintegration of much of the tubular epithelium (probably p.m.); glomeruli and vessels normal.

Bone marrow.—Some aplastic areas but greater part shows normal active marrow cells showing mitosis.

Ætiology.

The first question which arises is this:—Is the disease caused by the pregnancy? Or is it due to some other cause which more frequently attacks pregnant than non-pregnant women?

The following facts have to be remembered: First, in none of the cases seen did recovery take place before delivery. This, however, is not conclusive evidence in favour of the disease being due to the pregnancy since the shortness of the period between the onset of the symptoms and delivery does not leave much time for complete recovery. Moreover, the pregnancy acts, if not as the primary cause, at least as a strong contributing cause.

Secondly, delivery frequently has an unfavourable effect. It is not only that the patient often dies shortly after delivery which could be explained by shock, but there are cases where the anæmia continues to progress after delivery and death takes place after many weeks. This again is not conclusive evidence against the disease being due to pregnancy, as the explanation may be that the bone marrow is so seriously injured by the pregnancy toxin that it is unable to resume its function when the delivery is over.

Thirdly, there is said to be in Bombay and perhaps in other parts of India, an anæmia of unknown origin occurring in men and in non-pregnant women and differing from Addison's pernicious anæmia. During the past few months, I have been shown many cases undoubtedly due to secondary causes and among

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them two or three not so easily explained, while I have been told of others. Similar cases are from time to time published in the medical literature, some due to chemical toxins, others to unknown causes. An investigation into the causes of primary anæmia in India would give valuable assistance to our present enquiry.

The next question to consider is, how far the anæmia may be due to causes known to produce anæmia in India, namely, malaria, dysentery, hookworm and sprue.

Malaria.—In the present series of cases, every effort was made to detect malarial parasites in the blood, always before quinine had been given. The result was positive in 13 cases only. The infection in 10 cases was due to *P. falciparum* and in 3 cases to *P. vivax*. Four of these cases suffered from diarrhœa. The mortality of the 13 cases was 33 per cent. as compared with 42 per cent. for the whole series. As is well known *P. falciparum* very quickly disappears from the peripheral blood and it is possible that it might have been found more frequently in the deeper organs. In some cases it was searched for in the placental blood but without result. No clinical difference was seen in the cases with malarial parasites, nor was there much alteration in the blood picture. The red cells were not so scanty, the colour index was slightly lower (though above unity) and the mononuclear leucocytes were more numerous (an average of 9·1 per cent. as compared with 3·5 per cent. in 25 consecutive cases). It is not certain that the parasites were the cause of the anæmia even in these 13 cases, as many people in Bombay are similarly infected. In the report of the Executive Health Officer Bombay for 1924, under the heading malaria the parasite rates for the general population are shown for the years 1921-24 (in 1924, 2,098 slides were examined). The rates for different wards vary from a minimum of 0·90 per cent. to a maximum of 7·71 per cent. In the series of anæmia cases, the rate is 8·66 per cent. This indicates that the anæmia cases are more heavily infected than the rest of the population, but it is probable that the same result would follow if any group of people below par and exposed to the infection were examined.

Dysentery.—A history of dysentery was given or it occurred while the patient was under observation in 5 cases, but as a rule the stools were not dysenteric in character.

Hookworm.—Ova were found in only 1 case. The cases of pregnancy anæmia reported from other parts of India appeared to be no more common in hookworm than in non-hookworm districts. For instance, fewer cases were reported from Madras where hookworm is common than from Bombay where it is almost unknown.

Sprue.—Some of the cases bore a resemblance to sprue, on account of anæmia, persistent diarrhœa, raw tongue and burning sensations in the mouth and throat. They differed from it in their sudden commencement, the absence of emaciation or muscular weakness, the appearance of the stools, and the fact that recovery after delivery was as complete as in the non-diarrhœic cases.

Infective origin.—The frequency of the sudden origin with fever and rigors made one suspect an infective origin. A marked feature of the bacteriological examination was the frequency with which organisms were found in the urine. These differed in different patients and did not usually agglutinate with the patient's serum. They were in all cases intestinal organisms. The frequency of the diarrhœa suggested that the origin might be in the intestine and that some alteration of the bowel wall might allow organisms or toxins to pass into the circulation, the same theory in fact as is now being discussed in connection with pernicious anæmia. We are now following up this line of research.

Sepsis.—Puerperal sepsis sometimes produces considerable anæmia, but the cases under consideration were already in a condition of profound anæmia during pregnancy. In only two or three cases did the patient not come under observation until after delivery.

Nutritional origin.—This possibility has been considered. The disease is one which affects all communities and all classes of society. In the present series of cases there have been many who appeared to have a perfectly satisfactory diet. But it is possible that there may be some element lacking which is needed during pregnancy and which is not so often lacking in colder climates.

Whatever the cause, it may be that it comparatively seldom attacks ordinary individuals but that pregnant women are specially liable at the time when the greatest strain is being put on the blood-forming organs.

There are, however, certain difficulties in accepting this theory as correct. In the first place in such case one would expect the onset to be gradual, as the strain on the blood-forming organs became greater. In the second place there is an equal strain on all the maternal organs during pregnancy, but I know no instances of general diseases which especially attack pregnant women. They are of course liable to ordinary infections but not to an excessive degree. Pregnancy is a normal state and by a provision of nature the maternal organism adapts itself to the altered conditions, at least so far as resistance to external infection goes.

The possibility remains that anæmia of pregnancy is a toxæmia due to the products of conception. It has a good deal in common with that best known of the toxæmias, eclampsia. Both conditions occur during the second half of pregnancy, both are more

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frequent in primiparæ, in both complete recovery takes place after delivery (where death does not occur), and in neither do recurrences usually take place in subsequent pregnancies. There is one interesting point of difference. In anæmia, the fœtus never suffers from the same blood condition as the mother, and when it dies, it does so apparently from lack of nourishment. In eclampsia, the child occasionally suffers from fits. I have never met the two diseases in the same patient.

The facts already detailed regarding communities affected and social conditions will be of importance, if confirmed by further observation and observations in different parts of the country. The indication is that women who lead confined, inactive lives, while enjoying a good dietary, are more liable than others and this is in favour of the toxæmia theory. It is stated sometimes that this disease is increasing in frequency in India. It may be only that it is becoming more generally recognised as the subject of obstetrics receives more attention; or it may be that more luxurious living and more labour saving devices without any great improvement in the women of the middle and lower classes as regards education and hygiene are leading to an increase in the diseases of pregnancy.

Although this enquiry is still proceeding and the results are still incomplete, the above notes are published in the hope that practitioners who meet with similar cases will follow them up as far as possible and either publish the results or send me particulars when they appear to be likely to contribute to our knowledge of the causes of the disease.

I should like to express my gratitude to Lieut.-Col. F. P. Mackie, I.M.S., and other members of the staff of the Haffkine Institute for much valuable assistance and advice, especially with regard to the pathological side of the enquiry, and also to Dr. Sandilands, the Executive Health Officer, Bombay, for much information regarding health conditions in the city.

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THE SIGMOIDOSCOPE AS AN AID TO DIAGNOSIS IN CHRONIC DYSENTERY AND ITS SEQUELÆ.

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THE difficulties of accurate diagnosis of the more chronic forms of dysenteric infection are proverbial; a recent observation, with full laboratory facilities, by Manifold (1) of 129 cases gave 59 cases where the infecting organism was not proved, and many other authorities have from time to time stressed the difficulties experienced in this connection. One of the most frequent conditions which the practitioner in India is called upon to treat is diarrhœa, which may be mild or severe, constant or intermittent. There may or may not be a history of antecedent acute dysentery, in which case the practitioner's suspicions are aroused; but the one constant feature of dysenteric infection is the passage of mucus. It is precisely in these cases showing "the too rapid evacuation of too fluid stools" (2) associated with mucus that the results of treatment, unless based upon an accurately established diagnosis leave so much to be desired.

Acton and Knowles, (3), McRobert (4) and others have stressed the importance of the examination of fresh stools in attempting to identify the causal organism; and as pointed out by the latter, in the case of amœbic infection it is important that the stools be both fresh and warm. Yet it is notorious that in many cases, even in institutions with every facility for the collection and despatch of stools and with skilled laboratory workers, repeated examinations (during which the patient remains untreated) are necessary before the causal organism or organisms can be identified with certainty, and in some cases the latter are never discovered. The consequence is that in places where such facilities do not exist resort is of necessity had to "shot-gun" therapy, with the too frequent result that "relief" is substituted for "cure," subsequent relapses are common, and many cases go on to develop symptoms referable to organs remote from the affected bowel, but which nevertheless are the direct sequelæ of prolonged bowel ulceration.

Acton and Knowles, (3) in a review of the subject write:—

> "The medical officer in charge of a mofussil dispensary may often have to diagnose 'dysentery' and to prescribe the stock 'dysentery mixture' of aperient sulphates. At least we have the knowledge that he is not thereby doing any harm; but we look forward to the day when a few relatively simple microscopical tests will enable him at least to give a more or less correct guess and to apply the correct treatment."

Any factor, therefore, which helps to establish the diagnosis, especially if it be applicable in situations where skilled laboratory assistance is not available, is an aid to the practitioner and a benefit to the sufferer, not easily to be over-estimated. Such a factor is the direct inspection of the mucosa of the rectum and lower reaches of the pelvic colon by the sigmoidoscope. This instrument has long been in use among proctologists in the differential diagnosis of affections of the colon, with especial reference to carcinoma coli, Lockhart Mummery being one of its most

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prominent protagonists. But, as far as the writer can discover, priority in insisting on its routine employment as an aid to the diagnosis of chronic diarrhœa must be given to Hurst (5). Manson-Bahr and Gregg (6) have recommended its employment in amœbic dysentery; and its use in the diagnosis and treatment of chronic diarrhœas of colonic origin has since been stressed by Ryle (7). No originality therefore can be or is claimed for this paper, the object of which is to afford a wider recognition than seems so far to have been its fate among practitioners in India to a diagnostic procedure of great value, which, as a study of the list of cases in the included table will establish, has enabled the writer to come to a positive diagnosis and successfully to treat cases to which skilled laboratory assistance had only contributed negative results.

The employment of the sigmoidoscope demands no special skill; adequate preparation, gentleness and a 4-volt electric battery are the only essentials. In respect of the former it is perhaps permissible to enter into some detail.

The examination is best performed in the morning. Ryle (7) considers purgatives best avoided altogether; but in the experience of the writer a mild laxative administered overnight 36 hours before the examination and a low residue diet through the ensuing day are useful in Indian patients whose normal diet gives a bulky stool. On the night preceding the examination the lower bowel is washed out with saline or with lukewarm water by means of a wide-bore rectal tube and a large glass funnel, the process being continued until the fluid returns clear. The wash-out is repeated the following morning, and the patient, if his condition permits, is instructed to walk about, the more thoroughly to empty the bowel. To allay anxiety a hypodermic of morphine gr. ¼ is given 20 to 30 minutes before the examination, and at the same time the patient is instructed to insert into the rectum a suppository of cocaine gr. 1|50. With these precautions an anæsthetic has not, in the writer's experience, been necessary, and is obviously to be avoided if possible. The examination is best conducted in the knee-elbow position. The lithotomy position and the left lateral position have both been advocated, and can be employed in the case of patients in whom, due to prostration, prejudice or other special circumstances, the knee-elbow position is impracticable; but the passage of the instrument is easier and the view obtained is superior in the latter position. The instrument being generously lubricated with glycerine is inserted into the anus, and the patient directed to breathe deeply with his mouth open. Relaxation being thus obtained, the instrument is passed gently inwards, being left to find its own way. During its passage in the anal canal it is observed to point towards the patient's umbilicus and, on entry into the rectum, to change its direction to adapt itself to the sacral curve. On this change of direction taking place, the obturator is removed, and the eye-piece with illuminating device substituted, the remainder of the passage of the instrument being under direct visual control. Inflation, provided lubrication is generous, the bowel thoroughly emptied, and gentleness observed, is seldom necessary.

By these means a thorough and detailed inspection of the rectum and the lower 4 to 6 inches of the sigmoid is possible, and the condition of the mucous membrane and lumen of the bowel can be studied, the difference in appearance of the mucosa in chronic amœbic dysentery and in chronic bacillary dysentery and ulcerative colitis (which Hurst (5) considers, on strong evidence, to be causally associated) are clear cut and marked.

In chronic amœbic dysentery, the ulcers appear circular, saucer-shaped and distinct, with shallow craters and with bases which may be clean or contain a yellow slough; their size is about that of a pin's head. The intervening mucous membrane is normal in appearance. Sometimes the ulcers crown small elevations in the mucous membrane, in which case they present an appearance aptly characterised by Ryle as resembling minute boils or carbuncles. In more acute cases the appearance is similar, but ulceration is much more extensive, and flame-shaped, and blood stained mucus may be observed drifting into the instrument and obscuring the view.

Re-examination after adequate and successful emetine treatment reveals a mucous membrane which in mild cases may be absolutely normal in appearance, or may present recent scarring in more extensive cases.

In chronic bacillary dysentery and ulcerative colitis the mucous membrane may be generally injected, presenting a strawberry-red appearance, bleeding easily, or it may show extensive superficial ulceration. The ulcers are irregular in shape, shallow, their margins not undermined; and their bases show shreds of muco-pus of which a film may cover the whole ulcer. Areas of exuberant granulation tissue may mask subjacent ulceration, and the latter may only be revealed on removal of the former with a wool-carrying probe. The intervening mucous membrane is swollen, turgid, strawberry-red in colour, and bleeds easily.

In favourable cases the effect of treatment is theatrical; re-examination a few days later after appropriate serum treatment revealing a mucous membrane which may be completely normal in appearance. In other cases the infection and turgescence of the mucous membrane has subsided and healing is seen to be in progress, while in a few cases the process is much slower.

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No.	Class and sex.	Age.	Admitted for.	Previous dysentery?	Reaction.	Laboratory report. Microscopy.	Sigmoidoscopy.	Remarks.
1.	H. M.	25	Seven months breathlessness, cough with expectoration, slight swelling of feet, debility.	Yes.	Acid.	E. H. not found.	28-1-1927. Small discrete ulcers in sigmoid. 17-2-1927. Mucosa normal except for few yellowish - white scars.	
2.	H. M.	56	Abdominal pain aggravated by food, extreme wasting, constipation alternating with copious fluid diarrhœa.	No.	Alkaline.	Blood-cells and pus cells. E. H. not found.	Mucous membrane tinged and bleeding easily, many patches of superficial ulceration, extensive scarring of mucosa.	Died.
3.	H. M.	?	Fever with rigors, night sweats, anorexia, pain in abdomen and right shoulder.	Yes.	Strongly acid.	26-3-1927. Blood and pus nil. Protozoa nil.	30-3-1927. Many discrete ulcers with normal intervening mucosa.	
					Strongly acid.	28-3-1927. Protozoa nil. Blood nil. Pus cells few.		
					Alkaline.	8-4-1927. E. H. nil. Blood and pus not found.	16-4-1927. Ulcers healed.	
4.	H. M.	41	Constipation with occasional diarrhœa and passage of mucus.	Yes.	Acid.	E. H. not found. Blood nil: pus cells few.	Scattered discrete ulcers in lower sigmoid.	
5.	H. M.	23	Diarrhœa, tenesmus, passage of mucus.	Yes.	Strongly acid.	25-1-1927. E. H. not found. Blood and pus nil.	28-1-1927. Scattered ulceration of amœbic type in sigmoid.	
					Strongly acid.	27-1-1927. E. H. not found. Blood and pus nil.		
					Alkaline.	10-2-1927. E. H. not found. Blood and pus nil.	18-2-1927. Healed ulceration in sigmoid.	
6.	H. M.	60	Cough and dyspnœa emphysema.	?	Acid.	2-3-1927. E. H. not found. Blood and pus nil.	3-3-1927. Numerous discrete ulcers with yellow sloughs in craters and normal intervening mucosa.	Dyspnœa relieved, and lungs clear on discharge.
					Acid.	3-3-1927. E. H. not found. Blood and pus nil.		
7.	H. M.	47	Looseness and frequency of motions with griping.	Yes.	Alkaline.	E. H. not found, saponified fat in quantities.	Scattered discrete ulceration in lower sigmoid, some healing.	Emetine administered previous to admission, and continued with cessation of griping. Diarrhœa entirely controlled by dilute hydrochloric acid. Took discharge against advice and before completion of treatment.

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In the writer's experience diagnosis may confidently be made and treatment commenced on sigmoidoscopic appearances alone, notwithstanding a negative or non-committal report from the laboratory. The fresh stools are examined both clinically in the receptacle as passed, and in the laboratory. The former examination may not immediately reveal the presence of mucus, but the latter if present will usually be evident on tilting the pan, or on washing the evacuation with water. If the laboratory examination reveals the causal agent, appropriate treatment is instituted, and local inspection merely used to check its success, but a negative or suggestive report is taken as an indication for sigmoidoscopy.

In the attached table are recorded 7 cases admitted either for chronic diarrhœa or for asthmatic symptoms coming on for the first time so late in life as to suggest that they were due to some chronic infective focus. In all of these 7 cases the laboratory report by a skilled observer was negative or non-committal, and the diagnosis was established and treatment checked by the sigmoidoscope. In four cases relief was absolute and the patients were discharged cured. Of the three remaining, one case died from causes unidentified; one case was discharged with absolute relief of symptoms but with a guarded prognosis in view of emphysematous changes in the chest; while a third took his own discharge against advice, much improved in condition, with his symptoms completely controlled.

Cases with a positive laboratory finding are not here recorded; such are treated by appropriate measures at once, but discharge is not sanctioned until a sigmoidoscopic examination confirms the laboratory negative report; but the cases quoted exemplify the utility of the sigmoidoscope in diagnosis, even where skilled laboratory assistance is available. Ryle (8) records similar cases in which this instrument has established the diagnosis—and determined the cure—when the laboratory reports were persistently negative.

CONCLUSIONS.

(i) The sigmoidoscope is a valuable aid in the diagnosis of chronic dysenteric conditions.

(ii) Its employment requires no special technical skill and is therefore widely applicable.

(iii) Diagnosis is possible upon the appearances noted on sigmoidoscopy alone, which enhances its value in localities where skilled laboratory assistance is not available.

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PLASMOCHIN IN THE TREATMENT OF MALARIA.

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THE price of quinine places it beyond the reach of most of the inhabitants of the vast malaria-stricken regions of the world. The places in which it can be produced successfully are limited, and even were it sold at cost price many of those who need it would not have the money to buy it. An efficient and trustworthy substitute for quinine which could be produced cheaply in any well-equipped chemical factory would be of enormous benefit to mankind. Already several preparations have been put on the market as substitutes for the cinchona alkaloids, but they have proved useless. Chemists have tried for years to make a synthetic quinine, and recently a substance, closely allied to quinine, and which is said to be a powerful remedy for malaria, has been produced in the Bayer Works at Elberfeld. This substance is called "Plasmochin." In July 1926 the makers were good enough to send us a consignment of the drug and, at the end of the year, Sir Ronald Ross gave us a further supply. We are indebted to Professor W. Nocht for putting us in communication with the Farbenindustrie Aktiengesellschaft at Leverkusen.

Plasmochin is described in the papers handed to us by Sir Ronald Ross as an alkylamino-6-methoxy-quinolin salt, obtained by synthetic methods. A tasteless, light yellow, finely granular powder, fairly easily soluble in alcohol, soluble in water to 0·03 per cent. at 20°C. Readily converted by the hydrochloric acid of the stomach into the hydrochloride of plasmochin. It is put up in 0·02 gramme tablets (approximately one-third of a grain), each with a little groove across the middle so that it can be accurately broken in half, when one wishes to give doses such as 0·01 and 0·03 grammes.

The following doses are recommended in the treatment of benign tertian and quartan fevers:—One tablet should be given three times a day; that is 0·06 grammes, or about one grain daily. After five days' treatment, there should be an interval of three days and then four days' further treatment, and so on. "With due observance of these intervals the treatment may be continued for four or six weeks."

In the treatment of subtertian malaria, the administration of quinine and plasmochin together is recommended, because quinine acts more promptly on the schizonts while the plasmochin

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attacks the crescents. For this purpose the makers supply a sugar-coated tablet containing 0·01 gramme of plasmochin and 0·125 grammes of quinine sulphate (about one-sixth of a grain of plasmochin with two grains of quinine). The dose recommended is two of these tablets three times a day; that is, about one grain of plasmochin and twelve grains of quinine daily. This dose should be continued for one month without interruption; in the second month it should be reduced to one tablet three times a day.

Plasmochin is more poisonous than quinine. It should not be given on an empty stomach, nor should it be administered to persons suffering from diseases of the heart or liver. *"It should not be left to the patient to take the medicine himself but its administration should be always under the control of the nursing staff."* Cyanosis occasionally appears in patients who are undergoing treatment. When it does so, treatment should be stopped until it has disappeared, which it does in a day or two without leaving any ill effects. Large doses may cause cramps and pains in the stomach. The maximum daily amount for an adult is three doses of two-and-a-half tablets: that is 0·15 grammes or two-and-a-half grains in a day. Even 0·1 gramme daily, occasionally causes cyanosis, and it is advisable never to exceed that amount.

"When convulsive pains of the stomach or cyanosis of the lips are noticed after administration of plasmochin, it should immediately be stopped and only be given again when the symptoms have completely disappeared."

Dr. W. Röhl, (1926), chief of the chemotherapeutic division of the Elberfeld works, has carried out comparative experiments with quinine and plasmochin respectively, in the treatment of bird-malaria due to infection with *Plasmodium relictum*. He found that a dose of 1 c.cm. of a 1 in 800 solution of quinine was just sufficient to control the parasites, and that a stronger dose than 1 c.cm. of a 1 in 200 solution was poisonous for a bird weighing 20 grammes. When plasmochin was employed in place of quinine, Dr. Röhl found that 1 c.cm. of a 1 in 50,000 solution controlled the parasites and that the dose could be increased to 1 c.cm. of a 1 in 1,500 solution before symptoms of poisoning appeared. That is to say, plasmochin proved sixty times as powerful as quinine, and the effective dose was only one-thirtieth of the poisonous dose, the "working margin" of plasmochin being therefore 1 to 30 as compared with 1 to 4 in the case of quinine.

Professor P. Mühlens, (1926), of Hamburg administered plasmochin to 134 patients who were suffering from chronic malaria. The parasites disappeared and relapses were rarer in tertian and quartan malaria than they are after treatment with quinine. In subtertian malaria, plasmochin proved less powerful than quinine in its action upon the schizonts, but Professor Mühlens states that it has a unique and most valuable property in this form of the disease, namely, that it destroys the gametocytes, which quinine cannot do. Professor Mühlens therefore recommends that quinine and plasmochin should be administered together in the treatment of subtertian malaria, because the quinine acts upon the schizonts while the plasmochin destroys the crescents and thus prevents the patient from infecting mosquitoes and from being a source of danger to those around him. Plasmochin has also been used in the Balkans, in Italy, and in Spain, where it was found as effective in the treatment of acute malaria as it had proved successful in the treatment of chronic relapsing cases in Hamburg.

The Treatment of Malaria in Kuala Lumpur with Plasmochin.

Our observations were made on ninety-seven patients who had been admitted on account of malaria to the District Hospital at Kuala Lumpur, and for this privilege we are indebted to Dr. J. P. Fitzpatrick, the medical officer in charge of that institution. Seventy of the patients were Tamils and twenty-seven were Chinese. They were all immigrant labourers; fifty-eight had been less than one year in the Malay States and almost all of them were suffering from acute malaria. This series of ninety-seven patients comprised forty-six cases of benign tertian fever, twenty-nine subtertian, twelve mixed tertian, and ten quartan. Neither the patients with benign tertian nor those with quartan malaria were selected in any way; but, in the subtertian and mixed-tertian groups, the less serious cases were chosen for treatment.

It is not practicable to keep the ordinary Asiatic hospital patient under observation, and shielded from re-infection with malaria for a period sufficiently long to gauge the efficiency of drugs in preventing relapses. The patients at the District Hospital in Kuala Lumpur are drawn from a wide area; only seventeen of those treated with plasmochin came from the town or its suburbs. As soon as they considered themselves well enough, they insisted on leaving the hospital, there was no opportunity for further observation and, as most of them returned to the places where they had contracted malaria, there was every chance of re-infection. We were obliged therefore to limit our inquiry to the immediate effects of plasmochin upon the patient, the parasites and the fever.

Each patient was given a dose of one-and-a-half tablets, or 0·03 grammes, twice a day. That is about one grain daily. The average weight of the patients was 48·2 kilogrammes (106 lbs.). This is about 70 per cent. of the average weight of a European. The dose of 0·06 grammes, which was given to our Asiatic patients, is equivalent to a dose of 0·085 grammes given to a man weighing 70 kilogrammes.

Blood-films were stained with Leishman's stain and examined daily. The number of microscopic fields examined and the number of parasites were noted in each case; in the patients' records the

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result of each examination was written as a vulgar fraction with the number of parasites as the numerator and the number of fields examined as the denominator. This is admittedly a rough method; but, as all the slides were prepared by the same hand, it is useful for purposes of comparison and for estimating the progress of the case.

A sample of urine was examined every day, and, at the same time, an inquiry was made as to the presence of any toxic symptoms produced by the drug. The patients with subtertian and mixtertian infections were under special observation and examination for a period of about ten days in each case; those with quartan for eight days, and the benign tertian cases for six days. Plasmochin was given in doses of 0·03 grammes, twice a day throughout the period of observation, except in three cases.

Plasmochin in Benign Tertian Malaria.—Forty-six men with benign tertian infections were given one-and-a-half tablets of plasmochin, twice a day, with the result that none of them had a temperature over 100°F. after the third day of treatment, and, in every case, with the exception of a man who was suffering from bronchitis, it was normal after the fourth day.

The effect of plasmochin upon the parasites was equally striking. No parasites were found later than the fourth day of treatment in any of the forty-six patients, with the single exception of a man in whose blood one trophozoite was discovered in a thousand fields examined on the morning of the fifth day. In thirty-seven cases no parasites were seen later than the third day. The average number at the commencement of treatment was sixty in a hundred fields (Leitz 1|12 inch objective and No. 2 ocular). It is evident from these results which are tabulated in Table I, that the immediate action of plasmochin in benign tertian malaria is quite equal to that of quinine.

TABLE I.

BENIGN TERTIAN MALARIA.

Showing the last day of treatment on which fever and parasites were present in each case.

Case number.	Last day of fever.	Last day on which parasites were found.
1	3	4
2	2	2
3	4	4
7	1	2
8	1	2
9	2	1
10	3	2
11	1	2
14	4	4
15	2	3
16	1	3
18	1	4
19	2	2
23	4	3
25	1	2
26	1	4
27	4	1
28	2	2

TABLE I—(*contd.*).

Case number.	Last day of fever.	Last day on which parasites were found.
29	1	1
31	3	4
32	3	3
34	1	1
35	3	4
36	5	5
40	1	2
45	1	4
46	1	1
48	1	3
49	2	3
50	2	2
51	1	2
52	1	2
56	1	1
58	3	2
65	2	2
66	2	2
72	2	2
74	2	3
77	2	2
78	1	2
79	1	2
82	2	2
84	1	2
92	2	2
95	3	3
99	2	3

Plasmochin in Quartan Malaria.—Only ten cases of quartan malaria were available for treatment. Here again plasmochin proved at least equal to quinine. The parasites disappeared within five days of beginning treatment. The average number at the commencement was fifty in a hundred fields. In only one case did the fever last longer than the fourth day, and in this instance it was not due to malaria. The results are set out in Table II. The following case is cited because of the large number of quartan parasites in the blood and the rapidity with which they disappeared under treatment with plasmochin.

The patient, No. 101 in the series, was admitted with an average of 250 quartan trophozoites, ten schizonts and ten gametocytes in every hundred fields. After two days treatment, the number was reduced to fifteen trophozoites and five gametocytes; on the following day, there were only three trophozoites and one gametocyte; on the fifth day one trophozoite was found in five hundred fields; on the sixth and seventh days no parasites could be discovered, and the patient insisted on leaving the hospital.

TABLE II.

QUARTAN MALARIA.

Showing the last day of treatment on which fever and parasites were present in each case.

Case number.	Last day of fever.	Last day on which parasites were found.
4	6	2
42	2	5
44	4	5
54	3	4
62	1	4
70	1	2
83	4	3
87	4	5
88	3	2
101	3	5

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Plasmochin in Mixed Tertian Malaria.—Plasmochin was administered to twelve men who were suffering from mixed infections with *P. vivax* and *P. falciparum*. The results are shown in Table III. The benign tertian parasites quickly disappeared but the subtertian parasites, on the contrary, did not. They were found in eleven of the patients later than the fourth day, and, in seven cases, as they were still present at the end of a week's treatment, it became necessary to give quinine. The two following cases are selected as examples.

Patient No. 94 was admitted with an average of sixty subtertian rings, ten benign tertian trophozoites, two benign tertian schizonts and three crescents in every hundred fields. The fever quickly subsided under treatment with plasmochin and the parasites decreased in numbers. On the fourth, fifth and sixth days no parasites except crescents were seen; on the seventh day one subtertian ring was discovered: none was found on the eighth and ninth days, but on the tenth day there was an average of six in a hundred fields, accompanied by a rise of temperature. On the following day there were forty parasites in a hundred fields and the plasmochin, which had been continued without interruption, was stopped and quinine was given instead.

Patient No. 97, the second example, reacted in a similar manner; the subtertian parasites disappeared with the benign tertian after three days treatment, only to reappear on the sixth, seventh, eighth and ninth days. The treatment with plasmochin was then discontinued and quinine was given in its place.

TABLE III.

MIXED TERTIAN MALARIA.

Showing the last day of treatment on which fever and parasites were present in each case.

Case number.	Last day of fever.	Last day on which parasites were found.
12	3	7 Quinine.
21	3	7 Quinine.
24	3	5
33	8	8 Quinine.
38	2	4
39	9	9 Quinine.
43	4	6
47	2	5
57	1	8 Quinine.
60	3	6
94	10	11 Quinine.
97	9	9 Quinine.

(*The word "quinine" after a number, means that Plasmochin was discontinued and quinine was given instead.*)

Plasmochin in Subtertian Malaria.—Twenty-nine patients with subtertian malaria were treated with plasmochin, but the results were disappointing; the parasites persisted for six days or more in twelve cases and it became necessary to give quinine. The plasmochin did not prove to be entirely without effect on *P. falciparum;* in almost every case the number of parasites was greatly reduced and in some they disappeared entirely. The following are instances of such cases.

Patient No. 64 was admitted with five subtertian rings in a hundred fields. No parasites were found after the fourth day. Plasmochin was continued and daily examinations of the blood were made for sixteen days, but there was no relapse.

Patient No. 73 had three hundred subtertian rings in a hundred fields when treatment was begun. No parasites were found after the fourth day. The blood was examined daily up to the eighth day when he left hospital.

Patient No. 75 had a hundred-and-fifty parasites in a hundred fields at the commencement of treatment. They disappeared in four days and there was no relapse within the next six days during which treatment and daily examinations were continued.

Patient No. 76 had five hundred subtertian parasites in a hundred fields. They disappeared within five days of beginning treatment and there was no return during the next five days, after which the patient left the hospital.

Unfortunately, such good results were not obtained in all cases. Though the subtertian parasites nearly always decreased in number when treatment with plasmochin was begun, and sometimes disappeared entirely from the blood, relapses frequently occurred after a few days, in spite of the continuous administration of the drug in undiminished doses. The following cases are examples of the unsuccessful treatment of subtertian malaria. All of them were given uninterrupted plasmochin treatment throughout the period of observation.

Case No. 61.—There were forty subtertian rings in a hundred fields at the beginning of treatment; on the third day, there were less than two; on the fourth, there were five, and from the fifth to the tenth there was none. Parasites re-appeared, in small numbers, on the eleventh day and, in spite of uninterrupted treatment with plasmochin, they increased rapidly until there were twice as many on the thirteenth day as there had been when treatment was begun. Quinine was then given in combination with plasmochin and the parasites disappeared in three days.

Case No. 69.—Plasmochin was quite ineffective in this case. There were twenty-two parasites in a hundred fields at the beginning of treatment. On the fourth day there were four hundred and, as the patient was very ill, quinine was administered with the result that he soon recovered.

Case No. 85.—There were forty subtertian rings in a hundred fields at the beginning of treatment, but they were reduced to three on the third day and none was discovered on the fourth or fifth. On the sixth day parasites were found again and they gradually increased until there was a febrile relapse on the ninth day. Quinine was then given in combination with plasmochin, and the parasites disappeared after three days.

Case No. 86.—The parasites disappeared within three days of commencing treatment, though there were as many as three to a field at the beginning; but, after six days of freedom from parasites, during which plasmochin was continued, the patient relapsed and trophozoites reappeared in his blood.

In the two following cases plasmochin was not given continuously during the whole period, but at the end of a week's treatment there was an interval of several days, during which none of the drug was administered. The results were no better than in the cases where the treatment was uninterrupted.

Patient No. 68 was given the usual dose of 0.03 grammes of plasmochin, twice a day. He had an average of two parasites in each field, at the beginning of treatment; their number decreased and none was found on the sixth or seventh days. Plasmochin was then

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discontinued and begun again after an interval of four days, but the patient relapsed three days later.

Patient No. 93 had an average of more than two subtertian rings in each field when treatment with plasmochin was commenced. From the third to the eighth day no parasites were found and plasmochin was stopped for four days. It was begun again on the twelfth day; parasites reappeared on the fourteenth, and were still present on the seventeenth when the patient left the hospital.

The results of the treatment of subtertian malaria are set out in Table IV from which it is evident that plasmochin, given alone, is unsuitable for the treatment of this form of the disease. Many malarial fevers are due to mixed benign and subtertian infections. In these cases the subtertian parasites may escape notice at the beginning of treatment, and there is the risk that they may multiply without detection, while the patient is taking plasmochin, unless the blood is examined repeatedly during the course of treatment. It is therefore not a satisfactory remedy for out-patients who live at a distance from a hospital. The plasmochin compound tablets to which reference has been made contain a mixture of plasmochin with quinine and are designed to meet this objection. The dose recommended by the makers, which is two tablets three times a day, contains twelve grains of quinine, an amount sufficient in itself to control malaria in patients weighing less than 110 lbs. Plasmochin compound was employed with success in several refractory subtertian cases, but no cogent evidence was obtained to show that the quinine mixed with plasmochin was superior to quinine alone in controlling an attack of malaria. The tablets, made as they are at present, are unsuitable for use in a damp tropical climate; no sooner is the stopper of the bottle opened than their sugar-coating melts and they run together into a sticky mass.

TABLE IV.

SUBTERTIAN MALARIA.

Showing last day of treatment on which fever and parasites were present in each case.

Case number.	Last day of fever.	Last day on which parasites were found.
5	6	6 Quinine.
13	1	2
17	6	6 Quinine.
20	0	7 (Crescents only).
53	2	2
55	2	1
59	1	4
61	16	16 Quinine.
63	2	3
64	1	4
67	1	3
68	9	14 Quinine.
69	6	7 Quinine.
71	1	2
73	2	4
75	2	4
76	3	5
80	9	9 Quinine.
81	2	3
85	10	12 Quinine.
86	7	12 Quinine.
89	1	2
90	5	7 Quinine.
91	2	10 Quinine.
93	16	17 Quinine.
96	0	6
98	1	4
100	2	6 Quinine.
102	0	2 (Crescents only).

(The word "quinine" after a number, means that Plasmochin was discontinued and quinine was given instead.)

Subtertian Gametocytes.—Plasmochin was given to twenty-one patients who had crescents in their blood. The gametocytes persisted up to the tenth day of treatment in one case, but in no other instance were they found later than the seventh day, and in the majority, they were not seen after the fourth day. These results, as far as they go, support Professor Mühlens's contention that plasmochin has the unique property of destroying subtertian gametocytes, but further observations are necessary. It is very difficult to persuade patients to remain under observation in hospital when they no longer have fever and they are feeling well. Consequently, in many instances the examination of the blood was not continued for more than four or five days after crescents were last seen. In only five did the subsequent examination of blood-films extend over a period of ten days or more. These facts are set out in tabular form in Table V. The two following cases are given in more detail as examples.

Patient No. 96 had fifty crescents in a hundred fields at the beginning of treatment. On the fourth day there were fourteen; on the fifth, three; on the sixth, only one in five hundred fields; none was found on five days of subsequent observation.

Patient No. 102 had forty crescents in a hundred fields. None was found after the third day of treatment though

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thick and thin films were searched daily for a period of ten days.

TABLE V.

SUBTERTIAN GAMETOCYTES.

Showing the average number of crescents in 100 microscope-fields at the beginning of treatment and the latest day of treatment on which they were found.

Case number.	Number of crescents in 100 fields.	Latest day of treatment on which crescents found.
5	5	6
20	35	7
43	25	3
44	6	3
55	6	5
59	0.6	6
61	0.5	3
71	8	4
75	1	7
76	1	5
80	6	3
81	9	3
85	0.2	2
90	1	10
91	10	6
94	3	5
96	50	6
97	0.7	3
98	6	3
100	2	3
102	40	3

Toxic Symptoms due to Plasmochin.—Plasmochin is not unpleasant to take because it is tasteless and the dose is small. Unfortunately it is more toxic than quinine. Manson-Bahr (1927) states that cyanosis, which is the most common toxic manifestation of plasmochin, may occur after small doses and appear with great suddenness. The lips become blue, the gums and finger-nails are involved, and the face assumes a livid grey tint. The cyanosis is often accompanied by nausea and pains in the abdomen and the back. Manson-Bahr ascribes this cyanosis to methæmoglobinæmia and considers it analogous to the methæmoglobinæmia of potassium chlorate poisoning. In one of his cases violet-coloured cyanosis developed with a temperature of 101·4°F. on the fourth day of treatment, and within twenty-four hours methæmoglobin appeared in the urine with albumen and casts. The attack which lasted two days resembled a mild black-water fever. In a second case, cyanosis appeared after three days' treatment; the drug was stopped at once but the lividity of the lips and skin lasted for seven days and was accompanied by a considerable degree of nausea and abdominal pain. Polychroniades (1927) administered plasmochin to a group of forty-six patients in Salonika. Six had both cyanosis and abdominal colic, eight had cyanosis alone, and eight had colic alone. The symptoms were of short duration, and he considered them unimportant.

The doses of plasmochin given to the series of ninety-seven patients in Kuala Lumpur were smaller than those employed by Manson-Bahr; in no instance was more than 0·06 gramme given in one day. Two patients became alarmingly ill while undergoing treatment, but their illness could not be attributed with absolute certainty to the administration of plasmochin. One of these patients, No. 33, who was under treatment for mixed tertian malaria, had a sudden rise of temperature on the sixth day, and for five days it ranged between 102° and 104°F. The fever was not due to malaria; no parasites had been found for three days before the fever began and none was found while it lasted. The urine showed no darkening or other change, but there was cyanosis of the lips. The patient recovered entirely about a week after plasmochin was stopped. The second patient, No. 35, was under treatment for benign tertian malaria. The parasites disappeared from his blood on the third day and his temperature remained normal until the sixth, when it rose suddenly to 104° and he vomited and became very collapsed. No parasites could be found in his blood then or while his illness continued. In addition to these cases slight cyanosis of the lips was noticed in two European patients who are not included in this series. In one who was being treated for an attack of benign tertian, there was vomiting, diarrhœa, severe pains in the abdomen and pronounced acidosis. The urine contained a large quantity of diacetic acid, but no albumen or casts. The patient recovered in four or five days after the plasmochin was stopped. We are inclined to attribute these symptoms to the drug, but the patient had experienced a somewhat similar attack before, and has had another since, without taking any plasmochin.

When toxic symptoms supervene, they generally do so on about the fifth day. Eleven patients were given plasmochin continuously in doses of 0·03 gramme twice a day, under strict supervision, for periods of more than ten days; in two cases it was given continuously for sixteen days. No toxic symptoms developed in any of them. With the exception of the cases of which details have been given, no toxic symptoms or by-effects were observed. There was no instance of nausea, vomiting, diarrhœa, deafness, vertigo, amaurosis, tremor or headache due to the drug. The urine was examined daily. Albumen was present in a few of the patients when they were admitted to hospital; but this cleared up as the malaria parasites disappeared, except in three of the quartan cases. The plasmochin did not cause albuminuria. Records of blood-pressure were made during the course of treatment in thirty-seven cases, but there was no evidence that the plasmochin had any pronounced effect upon it.

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The Advantages and Disadvantages of Plasmochin.—The tastelessness of plasmochin and the absence of unpleasant symptoms after it has been swallowed, such as bitterness in the mouth, nausea, noises in the ear, deafness and amaurosis, are all points in its favour when compared with quinine. Its action in benign tertian malaria is equal to that of the cinchona alkaloids, and in quartan fever it destroys both trophozoites and gametocytes even more quickly. We have seen several cases in which relapses occurred after treatment, but the conditions under which our observations were made do not enable us to say whether they are more or less frequent than after treatment with quinine. Plasmochin appears to have the property of destroying the crescents of subtertian malaria, and this unique attribute suggests the possibility of ridding whole districts of malaria by mass treatment of the population. Unfortunately plasmochin has two great drawbacks; the first is the uncertainty of its action upon subtertian trophozoites and the second is its toxicity, which renders mass treatment impracticable. It must be administered under medical care, and those undergoing treatment should be examined daily, because toxic symptoms sometimes supervene with great suddenness. It would not be safe to issue it for sale to the general public or to supply it (as quinine is supplied in the Malay States) to police-stations and to local headmen for free distribution. It is not suitable for the treatment of gangs of labourers on railways or road-construction, where the actual administration of remedies is often in the hands of a native overseer. It is, in short, a drug more fitted for use in the hospital than for the out-patient.

Plasmochin cannot take the place of quinine, but it must be regarded as a long step towards the realization of a great ideal which is the manufacture of a powerful synthetic remedy for malaria, unlimited in its production by soil and climate, which would bring relief to many thousands who, for economic reasons, are unable to obtain quinine.

Acknowledgment.—In presenting this report we wish to acknowledge our great debt to Mr. M. Kandiah who examined all the blood-films and specimens of urine, under our immediate supervision. He also helped in many other ways, and willingly sacrificed Sundays and holidays that he might assist in this enquiry.

SUMMARY.

A series of ninety-seven patients, seventy of whom were Tamils and twenty-seven Chinese, were given 0·03 gramme of plasmochin, twice a day. The average weight of the patients was 48·2 kilogrammes (106 lbs.). Blood-films were examined daily and, at the same time, an enquiry was made as to the presence of toxic symptoms.

The patients with benign tertian malaria were under treatment for about six days in each case; those with quartan for eight days; those with subtertian, or mixed tertian for about ten days.

Forty-six men suffering from benign tertian fever were given plasmochin, with the result that the fever and the parasites disappeared by the fourth day in every case, with the single exception of a man in whom one trophozoite was found on the fifth day.

Ten cases of quartan malaria were treated. The fever disappeared by the fourth day and the parasites, including gametocytes, by the fifth.

Twelve patients with mixed tertian malaria received a course of treatment. The benign tertian parasites quickly disappeared, but the subtertian rings persisted and in seven instances the writers were obliged to give quinine because parasites were still present after a week's treatment with plasmochin.

The results in subtertian malaria were disappointing. Twenty-nine patients were given plasmochin, but in twelve cases it became necessary to give quinine. The drug was not altogether without effect upon the subtertian parasites. In almost every case they diminished during treatment, in some they disappeared altogether; but in others they increased again, although the treatment was continued, and they became as numerous as they had been at the beginning.

Plasmochin appears to have the unique and valuable property of destroying subtertian gametocytes, but further investigation is necessary. The drug was given to twenty-one men who had crescents in their blood. In one case they persisted up to the tenth day of treatment, but in no other instance were they found later than the seventh day and, in the majority, they were not seen after the fourth day.

Plasmochin is tasteless and has none of the unpleasant by-effects of quinine. It is however, more toxic than quinine. Cyanosis, ascribed by Manson-Bahr to methæmoglobinæmia, is the most common toxic manifestation. Two men in the group of ninety-seven became seriously ill during treatment, and also one patient who is not included in this series; but it is not certain that their symptoms were due to plasmochin. In two of the cases there was high fever and collapse; in one there was pain in the abdomen, diarrhœa, vomiting and acidosis. In two, there was slight cyanosis. Eleven patients were given 0·06 gramme of plasmochin daily for a period of ten days or longer without the appearance of any toxic symptoms.

Plasmochin should be administered under medical care; it is not suitable for sale to the general public or for the mass treatment of gangs of labourers; it is better fitted for the hospital than for the out-patient.

Several relapses were seen after a course of treatment, but the conditions of the enquiry did not enable the writers to determine whether such relapses are more or less frequent than after quinine treatment.

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AN EPIDEMIC OF DROPSY AMONG INDIANS IN FIJI.

By A. DEVA SAGAYAM, M.B.,
Nadi, Fiji Islands.

ABOUT February 1927, cases of dropsy began to occur among the Indians of this Colony and within a short time cases were reported by medical men from all parts of the Colony, but were confined to the Indian population only. The disease is still prevalent (May 1927), but the number of cases is decreasing.

A description of the chief signs and symptoms in these cases may be of interest:—

(1) *Onset.*—In most of the cases the attack started with low fever, rising to 101°F. later, this temperature persisting for a few days and then subsiding.

(2) *Gastro-intestinal symptoms.*—These are always present and rather prominent. Diarrhœa is marked in the early stages, the motions sometimes being blood-stained. Bleeding piles, however, are present in many cases; in fact, some patients were admitted primarily for hæmorrhoids, and the dropsical condition was only noted on admission.

(3) *Œdema.*—Œdema of the feet and legs is a constant feature of all cases, whilst in a few cases there is also œdema of the body or face. The interesting feature of this œdema is that it is firm to the touch, warm on the skin surface, and has a reddish flush. Even in dark skins the red flush can be seen. The œdema almost disappears in the mornings, but increases as the day advances.

(4) *Pain.*—There is no pain in the calves on pressure.

(5) *Knee reflex.*—In no case has the writer seen or heard it reported that the knee reflex was absent. On the other hand, in the majority of cases the knee reflex is normal or even exaggerated.

(6) *Urine.*—No albumin has been found in any case.

(7) *Hæmorrhagic growths.*—A peculiar feature of the disease is the appearance in some patients, in many parts of the body (sometimes in as many as ten different sites per patient), of peculiar cauliflower-like hæmorrhagic growths. These vary from the size of a pea to that of a walnut, with narrow pedicles; they bleed profusely. Some disappear after a few days, whereas others have required ligature to relieve the condition.

(8) *Heart.*—Except for an accentuated second sound in some cases, cardiac abnormalities were rare. In only a very few cases were any murmurs heard, or an enlarged liver from back pressure discovered.

(9) *Anæmia* is the rule in all cases, especially after a few weeks or months' duration of the disease.

Course of the disease.—Most patients come under observation after two or three weeks of suffering from the disease, whilst others can be seen walking about the streets untreated. On an average it seems to take from six weeks to two months for the symptoms to subside, though the writer has seen one patient who suffered from recurrent dropsy for four months, off and on. The general mortality has been low, the fatal cases usually showing general anasarca towards the end.

Cause of the disease.—Naturally the sudden and widespread prevalence of the disease caused much alarm among the medical authorities here, and a careful enquiry was made as to the possible causes of the disease among the sufferers. The following points are established: (1) That the disease occurs among Indians only. (2) That it is due to some factor connected with an article of diet used by them. Amongst such articles of diet used by Indians in Fiji are rice, mustard oil, *dal,* and condiments for curries, which are imported usually in bulk about once a year from Calcutta. A certain amount of rice and *dal* are also grown locally. The imported rice comes chiefly from Rangoon and Java. At first rice was suspected to be the cause of the disease, but against this was the fact that neither the Fijians nor the Chinese in the islands, who also eat the same rice, have suffered from the disease. The mustard oil fell strongly under suspicion, especially as some specimens of it were very bitter, and many sufferers still believe it to be the cause. In fact, so strong was this suspicion that the Chief Medical Officer has issued a public warning against the use of mustard oil in the *Fiji Royal Gazette.* In this connection the following extract from a letter received by the writer from the Acting Chief Medical Officer, Fiji, will be read with interest:—

"The final proof that our epidemic dropsy was due to mustard oil came about in a dramatic way at the Suva Gaol, though by a process of exclusion it was clear before any of the gaol cases developed. In the gaol the rations distributed to each man are accurately known. The only persons getting any extras, except such as are ordered by the doctor, are those of the cooks' mess. They get an extra pot of curried vegetables, such as egg-plant, etc., curried, and an extra ration of mustard oil. All Indian prisoners get ¾ oz. of mustard oil daily, and the cooks' mess get just double that amount. The cooks' mess, however, in all get five times the usual amount of curry-powder. All rations are most carefully weighed and divided up under European supervision and I do not think that there is any chance of any departure from the regulation scale, except that the gang that works at Government House may occasionally manage to get a lemon or other fruit; there were no cases in this gang.

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A cook developed epidemic dropsy in December last. His case was quickly followed by a second cook. These men were then replaced by two healthy men from the Government House gang. The gardener—a member of the cooks' mess—was the next person attacked, and then the two relieving cooks. No cases occurred inside the gaol except among the members of the cooks' mess. On the withdrawal of the mustard oil and its replacement by cocoanut oil and Coleman's mustard there have been no further cases. The curry-powder supplied to the gaol was of 'Tiger' brand. Elsewhere, the use of this powder has proved harmless. In several districts in which 'Tiger' brand curry-powder was not available, cases of epidemic dropsy occurred, whilst the majority of local patients with epidemic dropsy did not use 'Tiger' brand curry-powder. I think, therefore, that we have proof convicting the special supply of mustard oil as causing the epidemic. I had one patient who did not eat rice at all, except as an occasional breakfast dish."

This short description of the epidemic is written in the hope that it may be of interest to medical men in India, and also to elicit information with regard to the following points: (1) Whether the disease is or is not identical with the epidemic dropsy of India, since the knee jerks were not lost in the Fiji cases. (2) Whether the association of hæmorrhagic new growths with epidemic dropsy has been noticed in previous epidemics. (3) Whether any article of diet other than rice has been proved to cause this disease. The very interesting account given by Dr. Anderson in the *Indian Medical Gazette* for February 1927 has been read by the writer, but in the Fiji outbreak person-to-person infection can be ruled out absolutely, as widely separated areas were affected simultaneously.

My grateful thanks are due to Dr. P. Harper, Acting Chief Medical Officer, Fiji Islands, for permission to quote from his letter as above. By his work at the Colonial War Memorial Hospital, he has largely helped to arrive at the conclusions quoted in these notes as to the causation of this epidemic in Fiji.

. . . . . .

(*Note.*—It is to be noted, in connection with Dr. Sagayam's article, that the members of the cooks' mess presumably received an extra supply of rice in addition to an extra supply of mustard oil, and the evidence adduced is perhaps not inconsistent with the view that the outbreak might have been due to the importation of an infected supply of rice from Calcutta. During the monsoon months of 1926, Calcutta was subjected to a very severe outbreak of epidemic dropsy, and there is reason to suppose that large supplies of the rice of certain grades in Calcutta were infected. This might easily correspond to the importation of infected rice into Fiji during the subsequent cold weather; in fact, it would be interesting to trace the possible connection between importation of rice from different sources into Fiji prior to, during, and after the epidemic with the incidence of the disease. With regard to Dr. Sagayam's second query, the association of sarcoids (new growths of the nature of capillary nævi, which bleed freely to the touch) with the Calcutta epidemic of the autumn of 1926 was especially noticeable, and is the subject of a special memoir by Lieut.-Col. H. W. Acton, I.M.S., of the Calcutta School of Tropical Medicine, recently submitted for publication to the *Indian Journal of Medical Research.*—EDITOR, *Indian Medical Gazette.*)

THE INCUBATION PERIOD OF KALA-AZAR.

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ONE of the difficulties besetting research work on kala-azar is our comparative ignorance with respect to the incubation period of the disease. Inoculation experiments with animals in which the virus is introduced in large doses by various routes can do nothing to clear up the problem, and the solution can only come by the collection of records of cases in which a definite and strictly limited sojourn in an endemic area has been followed by contraction of the disease.

Certain conditions must be laid down as essential if these records are to have any scientific value. These are:—

(*a*) The individual, previous to his sojourn in the endemic area, must have lived all his life in a known non-endemic area.

(*b*) His sojourn in the endemic area must be of short duration, in order to narrow down the limits of time within which the disease must have been acquired.

(*c*) The time between the sojourn in the endemic area and the contraction of the disease must have been spent in a known non-endemic area.

The accumulation of properly authenticated records of cases complying as nearly as possible with these conditions would, in time, yield results of great value in arriving at a computation of the limits within which lies the incubation period of kala-azar.

It is with this object in view that the case to be recorded below is considered worthy of being placed on record. The history of the case is as follows:—

U. Lokendro, a young Khasi male, æt. about 22 years, had lived all his life in Shillong, a non-endemic area in the Khasi Hills, never once leaving the district. In October 1922 he went to Gauhati, which is a highly endemic area, and stayed there for a week in the compound of the Commissioner, Assam Valley Division. He then returned to Shillong. In June 1923 he went to Dibrugarh, an area of very low endemicity, arriving by mail train on June 30th, 1923, a journey of less than 24 hours. In Dibrugarh he sat for his matriculation examination, and stayed in the station one week. He then returned direct to Shillong, again travelling by mail train.

Two or three weeks after arrival in Shillong he was attacked by fever, having previously enjoyed robust health. The fever lasted without intermission for about a week. After an intermission of two or three days the fever recommenced and thereafter continued intermitently for nearly one year, while the patient became emaciated, weak, and unable to do any work. At the same time the spleen became greatly enlarged. During this period he was treated by private practitioners for various diseases and underwent prolonged quinine treatment without any

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alleviation of the fever. In June 1924 he came to the Pasteur Institute, Shillong, for advice. Spleen puncture was performed by Assistant Surgeon Kundu working under Lieutenant-Colonel E. D. W. Greig, I.M.S., Director of the Institute. Slides and culture both showed a heavy infection of kala-azar. The case was treated with urea-stibamine and made an uneventful recovery.

Discussion.

The value in recording a case such as that set forth above lies in the fact that most of the essential points as regards time and place are clear cut and definite. The patient is an educated Khasi, and his statements as regards his history previous to contraction of the disease are to be relied on, and indeed were locally verifiable. The statements made in this account may therefore, excluding the improbable fallacy of deliberate fraud, be regarded as statements of fact, from which one is justified in drawing certain conclusions as to the probable incubation period of the disease in this particular case.

The possibilities as to the time the disease was contracted are two only and the incubation period, with certain reservations to be considered, is similarly limited. These possibilities are: (*a*) The infection with kala-azar was contracted in Gauhati in October 1922 and the disease manifested itself in late July or early August 1923, giving an incubation period of 9 to 10 months. (*b*) The infection with kala-azar was contracted in Dibrugarh in early July 1923 and the disease manifested itself in late July or early August 1923, giving an incubation period of 2 to 4 weeks only.

In the light of available knowledge of the distribution of kala-azar in Assam the probabilities are overwhelmingly in favour of the first assumption. Gauhati is a highly endemic area, kala-azar being widely distributed both in the town itself and in the surrounding country. Dibrugarh, on the other hand, I am informed by the Director of Public Health, Assam, is an area of very low endemicity, the majority of cases occurring there being imported. The energetic survey and treatment measures of the Public Health Department appear for the moment to have checked the active spread of the disease near the borders of the Sibsagar and Lakhimpur Divisions of Assam. It is unlikely, therefore, that in this case the disease was contracted in Dibrugarh. Another point in favour of the first hypothesis is that if an incubation period of a few weeks only were at all common in kala-azar it is unlikely that our views on the incubation period would be so vague as they still are. The tentative conclusion we draw is that in the case under review, the incubation period of kala-azar lasted for 9 to 10 months.

In an earlier paragraph certain reservations to be made in coming to any conclusions were mentioned. The two most important of these are as follows:—

(1) The disease might have been contracted on the second visit to the plains during the train journey to Dibrugarh or on the way back, the whole of the western part of the journey being through highly endemic areas. If the theory of *Phlebotomus argentipes* as the probable vector of the disease be taken for granted, the breeding and feeding habits of the fly make it improbable that the infection should have been contracted in a train. Even in the unlikely event of this occurring it would only make a difference of a few days in any computation of the incubation period.

(2) The criticism might be raised that the initial fever in late July or early August 1923, ushering in a period of continued and increasing ill-health, was not really the onset of kala-azar, since this disease remained undiagnosed for nearly one year. This is certainly a possibility and, if true, would affect the computation of the length of the incubation period, but the symptoms during the whole of this period of one year, and the progressive emaciation and weakening of the patient were typical of the history of many cases of kala-azar.

In the history of this case one other fact is brought out which is important, and about which there can be no question. This is the fact that, since neither of the two periods spent in endemic areas exceeded about a week, prolonged residence in an endemic area is not essential to the contraction of the disease. In other words the disease can be contracted without prolonged and oft-repeated exposure to infection, whatever form this exposure may take.

A PRELIMINARY NOTE ON THE TREATMENT OF SMALL-POX BY INTRAVENOUS ADMINISTRATION OF POTASSIUM PERMANGANATE.

By J. H. THEODORE, I.M.D.,

Military Assistant Surgeon, King Institute, Guindy.

OF all the remedies used to prevent pitting and scar formation of variolous lesions, potassium permanganate externally applied is said to be the most valuable. A 5 per cent. solution is used as a paint two or three times a day for about a week. Iodine, mercury and the phenol compounds are in this respect inferior to potassium permanganate. Experiments conducted *in vitro* have shown that potassium permanganate in a dilution of 1|100,000 is sufficient to destroy vaccinia virus, (Gordon, 1925).

I had the idea that intravenous injection of potassium permanganate in the treatment of small-pox infection might abort the disease, acting either by direct action or by stimulating the body defences.

The following experiments were carried out (1) with the object of testing the efficacy of the drug to destroy the viruses of vaccinia and variola *in vivo* (2) to ascertain the value and the possibility of using a solution of potassium permanganate intravenously as a remedial measure in small-pox.

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Experiment 1.—The toxicity or tolerability of potassium permanganate when administered intravenously was first tested on rabbits. Working up from a dilution of 1|50,000 it was found that rabbits stood an injection of 10 c.c. of a 1|500 solution without any ill-effects, even though the injection was repeated on three consecutive days. Higher concentrations were not tried.

Experiment 2.—Tried experimentally on myself in the dose mentioned potassium permanganate did not affect either liver or renal efficiency.

The following figures show the result of the efficiency test before and after administration of 10 c.c. of 1|500 solution of potassium permanganate intravenously.

Note.—No reaction was noticed after the injection.

	Before administration of Potassium Permanganate.	After administration of Potassium Permanganate.
Blood urea	.. 39 mgm. in 100 c.c.	40 gms. in 100 c.c.
Non-protein nitrogen	.. 56 „ „ „ „	56 „ „ „
	Cholesterol—140 mgm. per 100 c.c.	

Blood sugar.—

Before alevulose (40 gms.) ..	0.14%	0.118%
½ hour after	0.135%	0.122%
1 hour after	0.115%	0.135%
1½ hours after	0.1025%	0.135%
2 hours after	0.1025%	0.118%

The blood sugar curve in this case before administration of potassium permanganate is peculiar, but in no way was the liver or renal efficiency been disturbed. I am indebted to Dr. S. Manadyar, Ph.D., Biochemist, Medical College, Madras, for the above analysis.

Experiment 3(*a*).—To test the effect of intravenous injection of potassium permanganate on vaccinia (preliminary experiment).

Five rabbits were vaccinated with potent calf lymph on the flanks and given an intravenous injection of 1|1000 solution of potassium permanganate in distilled water 6 hours after vaccination.

Result of vaccination (72 hours reading).

Rabbit 1. Vaccination failed.
„ 2. Reaction apparently vaccinoid.
„ 3. Do. do. do.
„ 4. Vesiculated.
„ 5. Reaction apparently vaccinoid.

Control; nil.

Experiment 3(*b*).—It was decided to try a higher concentration. A batch of 5 rabbits were vaccinated and 20 hours after vaccination, four of the rabbits were given 10 c.c. of a 1|500 dilution of potassium permanganate intravenously, and 1 rabbit was kept as control.

Result of vaccination (72 hours reading).

Rabbit 1. Vaccination failed.
„ 2. Do. do.
„ 3. Vesiculated but apparently aborted.
„ 4. Reaction apparently vaccinoid.

Control Rabbit 5. Successful vaccination.

Experiment 3(*c*).—A batch of 8 rabbits were vaccinated in the following way. Previously tested seed lymph was taken and diluted as follows:—

1|100, 1|200, 1|300, 1|400, 1|500.

The rabbits were shaved on the back and 5 areas of 10 c.mm. each were marked. Each of the areas were then sown with one of the dilutions. Four of the rabbits were selected at random to serve as controls and the remaining four were given 10 c.c. of a 1|500 solution of potassium permanganate intravenously 20 hours after vaccination.

Results (72 hours reading).

Injected after vaccination:
- Rabbit 1. Reaction apparently vaccinoid in all dilutions.
- Rabbit 2. Taken but aborted.
- „ 3. Vaccination failed.
- „ 4. Vaccination failed.

Controls:
- Rabbit 5. All dilutions taken very well.
- Rabbit 6. All dilutions taken; dilutions 300, 400, 500 more vigorous than 100 and 200.
- Rabbit 7. Mild vesiculation with moisture under the scab.
- Rabbit 8. Failure

The results of these experiments tend to prove that potassium permanganate administered intravenously has a definite tendency to abort successful vaccination in rabbits, in the dose mentioned.

Experiment 4.—*The effect of intravenous administration of potassium permanganate on variola.*

At the time of carrying out these experiments only three cases of small-pox were available for observation. These cases were given a single dose of a 1|500 solution. The results, summarised as follows, were furnished by Dr. S. L. D. Masilamony, R.M.O. Infectious Diseases Hospital, Tondiarapet.

Case No. 1.—Male, aged 20. On admission, 3rd May 1927, vesicles going on to pustulation. Rash discrete—body and face—4 days duration. Injected on 5th May 1927. 6th May 1927, vesicles still discrete. No fresh crops noted. Central pitting and umbilication of existing pustules with blackish pin points in centre. No constitutional symptoms were noticed as the result of injection.

7th May 1927.—General appearance of drying and scab formation.

8th, 9th, and 10th.—Complete scabbing. No secondary rise of temperature.

11th May 1927.—Bathed. Discharged on 19th May 1927.

Case No. 2.—Male, aged 28. Admitted on 2nd May 1927. Three days duration. Few discrete vesicles on body and face, with marked macular eruption on face. Potassium permanganate 10 c.c. of 1|500 dilution injected intravenously on 5th May 1927.

6th May 1927.—No fresh crops. Macular rash subsiding. No constitutional symptoms were noticed as a result of the injection.

7th May 1927.—No pitting. Vesicles definite tendency to dry.

8th May 1927.—Drying and scabbing.

10th May 1927.—Completely scabbed.

Bathed and discharged on 15th May 1927.

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Case No. 3.—Female, aged 28. Admitted on 3rd May 1927. Discrete vesicles on body with macular rash on face and hands. One day's duration.

4th May 1927.—Fresh crop of vesicles on body and face.

5th May 1927.—A few more vesicles on body. Injected with 10 c.c. of potassium permanganate of 1|500 dilution intravenously.

6th May 1927.—Macular rash on face did not develop into vesicles. Appears to have been aborted, with blackish pin points at site of rash. No constitutional symptoms were observed as a result of injection.

7th May 1927.—All vesicles show a marked tendency to drying and scab formation.

8th May 1927.—Complete scab formation. No secondary rise of temperature.

Bathed and discharged on 16th May 1927.

I am indebted to Dr. Govinda Pillay, Health Officer of the Corporation of Madras for access to the cases observed.

Conclusions.—Potassium permanganate, administered intravenously to man in the strength and doses mentioned, exhibits no toxic properties.

2. The maximum dose tolerated is probably much higher than those tried.

3. Potassium permanganate has a definite tendency to abort the evolution of vaccinia virus when administered intravenously into rabbits.

4. The number of cases of small-pox treated with relatively small doses is obviously too few to allow one to draw any definite conclusions, but is sufficiently encouraging to warrant further trial, which is being done.

I am indebted to Major H. H. King, I.M.S., Director, and Dr. C. G. Pundit, Assistant Director of the Institute, for permission to carry out the experiments and for advice from time to time during the course of the experiments.

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SPECIAL ARTICLE.

A POST-GRADUATE LECTURE ON THE PATHOLOGY OF PLAGUE.*

By KHAN BAHADUR N. H. CHOKSY, C.I.E., M.D.,

Late Superintendent, Arthur Road and Mahratta Plague Hospitals, Bombay.

NATURE has not endowed man with a specific means of resistance against the *Bacillus pestis.* When it invades the system, the whole organism therefore responds and rises in self defence to ward off its baneful effects. And thus it is that a reaction of varying degrees of intensity results, the obvious manifestation of which is the elevation of temperature, with all its familiar concomitants, that we recognise as fever. The invasion cannot be repelled otherwise; whenever the reaction is feeble or non-existent—as occasionally occurs if the infection is profound—it bespeaks the early doom of the unfortunate victim. The reaction, it will thus be realised, is beneficent, and any active intervention on the part of the physician to curtail, control or modify its course, by the administration of internal antiseptics is not only futile, but fraught with the gravest danger to the patient. So also is the effort to lower the temperature—the index of the reaction—by the exhibition of antipyretics, as it is invariably observed that it rises again and again, as often as it is reduced by their action. Nature strongly resents this intervention. A little reflection will show that such interference with the struggle it is making to antagonise the invasion, seriously militates against all chances of recovery. No infective process has ever been overcome by such methods and the same has been the experience with plague, where death from hyperpyrexia is extremely rare. And yet how often do we not see the poor helpless patient being plied with repeated doses of these drugs, through lack of due appreciation of the nature of the reaction or to placate the patients' friends—nay to pander to their ignorance? There exists a popular obsession that the fever is the disease, that it is dangerous to life and that it should be reduced,—cost whatever it may. Is it not our duty to combat this delusion?

I will now briefly touch upon the phases of the reaction as observed in the different types of plague. It may be as well to observe here that the infection in plague is not multiple; it is but a single infection by the *Bacillus pestis* alone, and no other organism plays the primary part. Its virulence, however, is not uniform; it varies very greatly in individual cases, though not on the whole, as has been demonstrated at Bombay, where, in spite of waning epidemics and fewer infections, the fatality among hospital cases has not markedly decreased.

Types of Plague.—Excluding anomalous and atypical cases, the disease clinically manifests itself in four distinct types, according as it primarily involves the lymphatic system, the blood, the lungs, and the skin, and is thus recognisable as the bubonic, septicæmic, pneumonic and cellulo-cutaneous types respectively.

The Bubonic Type.—The curve of temperature in this type (Chart I) extends to about ten days in uncomplicated and favourable cases, i.e. when the infection is confined solely to the lymphatic system, and indicates that the disease is self limited. It is divisible into three distinct periods:—

(*a*) The sudden elevation of the first day oscillates on the second, and is followed by a marked remission of two, three or even more

* Delivered at the Seth Gordhandas Surderdas Medical College, Bombay, on 15th June, 1927.

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degrees on the third day. The general symptoms indicate serious infection.

CHART I.

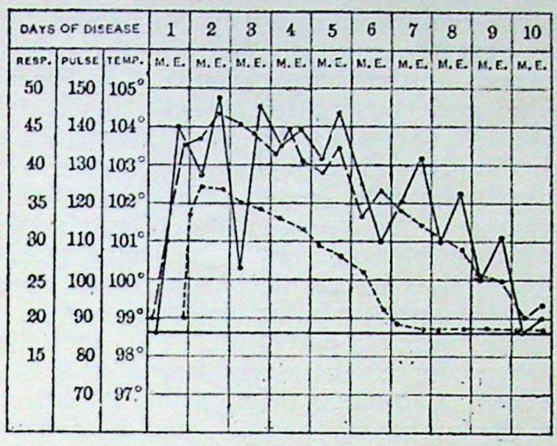


Chart of a normal case of plague of the bubonic type. (Solid line = temperature; dash line = pulse; dotted line = respiration. Same device in the other Charts.)

(*b*) The second period extends from the third to the sixth or seventh day, with rises and falls, though on a somewhat lower range than in the preceding phase, when very grave symptoms predominate.

(*c*) The third is characterised by a gradual ladder-like fall up to the tenth day, with considerable amelioration in the symptoms and general condition of the patient.

The most critical period is during the second stage, at which time death may occur, usually between the fifth and the sixth days by which time septicæmia has set in. If, on the other hand, complications like secondary pneumonia and

CHART II.

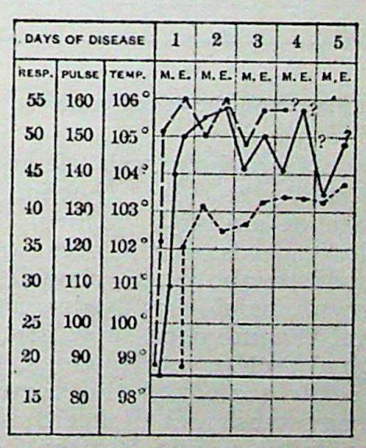
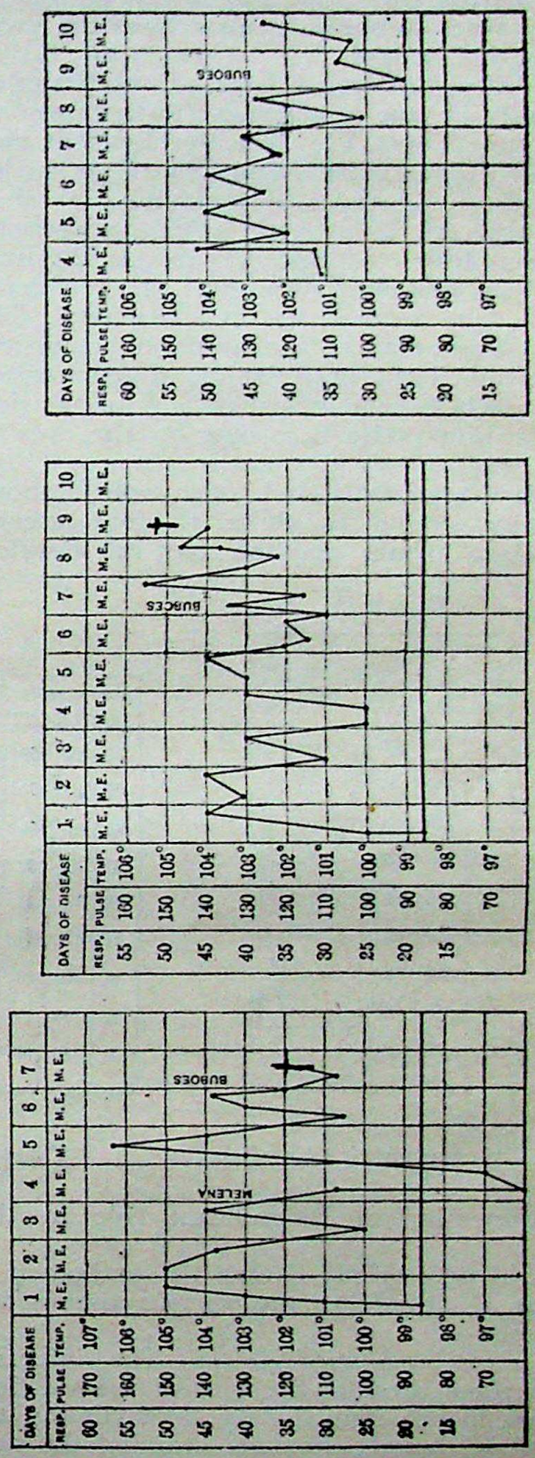


Chart of the septicæmic type of plague.

buboes, or grave toxæmia, etc., develop, the struggle is more prolonged, the primary uncomplicated curve becomes greatly extended until the patient succumbs in the second or third week, or even later. If he eventually survive, he is more often than not a physical or even a mental wreck.

II. *The Septicæmic Type.*—In this type (Charts II and III) the first curve behaves in

CHART III.



Charts of the septicæmic type of plague to illustrate the presence of internal hæmorrhage and the late development of buboes just before death.

the same manner as above; thereafter the patient generally succumbs between the third and fourth day with the temperature ranging between 103° to 105°. If life is prolonged, profuse hæmorrhages, internal and external, set in, with all the signs of collapse, followed at times by marked elevations that coincide with the late appearance of buboes, from the seventh to the tenth day—often just before death.

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III. *The Pneumonic Type.*—Here, too, the first curve (Chart IV) is similar to the two preceding, but in its rapid fatal termination between the third and fourth day the rise of temperature is not so evident as is the great respiratory distress.

IV. *Cellulocutaneous Type.*—Considerable irregularity in the reaction is to be found in this type (Chart V). The development may be, and often is, marked and gradual, or sudden as in the other types, depending as it does upon the rapidity with which a strictly localised lesion of the skin infects the subcutaneous cellular tissue and the lymphatic system, and spreads at the periphery. The curve of temperature oscillates with remissions of varying extent, until the line of demarcation appears when the necrosis is ready for excision. Its duration varies according to the area of the tissues involved, as also the onset of secondary septicæmia and other complications, and may extend to three to four weeks. Secondary buboes may or may not develop, but they play an insignificant rôle in this type.

I will now briefly sketch the pathology of plague as it affects the various tissues and organs:—

I. *The Lymphatic System.*—The infection takes place through the bite of the rat-flea; the bacilli are immediately taken up by the superficial lymph channels draining the area without any visible traces; at a certain stage their further progress becomes arrested as they become intercepted in the lymph glands in the groin or axilla, although the bite may have been inflicted on the foot or hand,—even occasionally on the opposite limb. No visible trace of the point of infection is noticeable except in about 8 to 10 per cent. of cases; more often than not it is so minute as to escape detection on the first day. When fully developed later it assumes the form of a papule, phlyctenule, or a blister, spherical or umbilicated, from the clear contents of which pure cultures can be obtained. The glands become greatly enlarged, the capsule is tense; they are congested and their blood and lymph supply become enormously increased. The bacilli greatly multiply within the matrix. Numerous surrounding glands then become infected and thus nature makes an effort to isolate the bacilli locally and prevent their further ingress into the system. These are of no avail generally, as the lymph channels—especially in the groin and axilla—communicate directly with the veins, as demonstrated by Leaf, and thus infect the blood-stream, causing secondary septicæmia, or else they convey the bacilli to distant parts of the body with the development of secondary buboes and secondary pneumonia, e.g., primary infection from the buboes in the neck may be conveyed to the mediastinal glands and thence to those in the groin. The buboes soon become embedded in an exudation of serous œdema, which may even be hæmorrhagic and, in severe infections, the whole limb becomes involved. In the case of axillary buboes the œdema extends downwards to the crest of the ilium and upwards to above the clavicle. When it breaks down, incision and drainage at the lowest level become necessary. In the case of deep cervical and parotid buboes, the œdema extends to the scalp and the vertex. As the disease progresses, foci of necrosis are found within the buboes, which often become adherent to the adjacent venous trunks, and thus establish another channel for direct infection of the blood. Eventually, the whole mass breaks down. The buboes in the groin generally infect the superficial and deep iliac glands, the mesenteric glands, and other glands along the course of the abdominal vessels. There also occurs at times a descending lymphangitis and the glands in Hunter's canal, and in the

CHART IV.

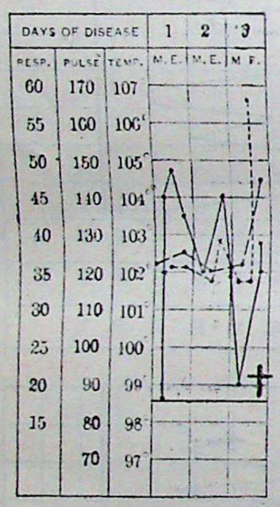

Chart of the pneumonic type of plague.

CHART V.

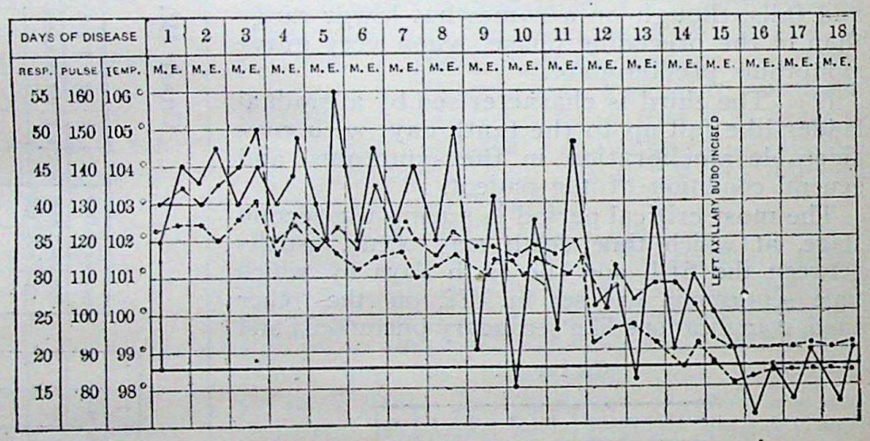

Chart of a normal case of plague of the cellulocutaneous type.

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popliteal space and the calf become infected. Similar upward and downward infection occurs in the upper extremity also. When the deep lymphatics suppurate, the whole chain from the groin or axilla downwards has to be removed by a series of incisions along their course, and serious surgical difficulties arise when the deep lymphatics of the neck are affected. The secondary buboes may or may not suppurate. In the case of iliac buboes, incision through the abdominal wall becomes necessary to prevent them from bursting into the peritoneal cavity. Secondary infections through the patient's fingers are liable to occur in incised buboes, that can only be relieved by polyvalent auto-vaccines. Gangrene, and even gas-gangrene, have also been observed though rarely, I described some cases in the *Lancet* several years ago, when this infection was known as emphysematous gangrene. Pus from the buboes remains more or less infective from the presence of the *Bacillus pestis* up to about the fifteenth day of illness; but cultures made from iliac pus have revealed their presence even up to the forty-fifth day. It is a remarkable fact that buboes do not suppurate in the cases treated on the first day of illness with anti-plague serum.

II. *The Blood.*—By far the most important part in the pathology of plague is played by the blood, inasmuch as the degree of its infection or its non-infection determines the fate of the patient. Our earlier observations the serum treatment of plague having given very disappointing results, we sought to determine the reason. It was eventually discovered in the septicæmia present. It was found on investigation that from 30 per cent. to 35 per cent. of patients admitted into the hospital usually between the third and fourth day of illness were sterile, i.e., they had no blood infection, but that it existed in the remaining 65 per cent. to 70 per cent. The septicæmia is of the progressive type and is most intense just prior to death. The number of organisms varies from 10 to over a million per c.c. Microscopic examination of blood smears is generally of little help except in a small percentage of cases and reliance has to be placed mainly on cultural methods. The usual practice of arriving at the diagnosis of plague by the microscope is therefore unreliable, as a negative result indicates only that there is no blood infection, but it does not exclude the presence of plague infection in the system. Smears from gland puncture are thus necessarily indicated. If the number of colonies growing on the agar slope from 0·25 c.c. of blood numbers 10 or under, the case is labelled +; if over 10 and under 100 ++ and if there is a thick growth over 100 +++. The largest number usually fall within the last two categories, and they have invariably proved fatal in spite of all and every variety of treatment. Plus (+) cases with 2 to 4 colonies only give a recovery rate of about 20 per cent. to 25 per cent. The sterile cases, on the other hand, have a recovery rate of between 50 per cent. to 65 per cent. in different epidemics. It may as well be stated here that the terms "plague-septicæmia" and "septicæmic plague" are rather loosely applied and are generally held to be interchangeable. Such is not, however, the case. *Septicæmic plague* means that there is primary infection of the blood; whereas plague septicæmia is a secondary infection in the bubonic and cellulocutaneous types. Not much attention was directed in these studies to the differential blood count, but leucocytosis with considerable increase in polymorphonuclears was generally noted. As the *Bacillus pestis* belongs to the group of organisms that produce hæmorrhagic septicæmia, hæmorrhages internal and external are the keynote; the most common being coffee-ground vomiting, hæmatemesis, hæmaturia, melæna, menorrhagia, sub-conjunctival hæmorrhage, etc.; hæmatoma of the dura mater has also been observed. In grave septicæmic cases, petechiæ and extensive patches of subcutaneous hæmorrhage are noticeable. The *Bacillus pestis* produces in culture a hæmolysin which has the property of dissolving the red corpuscles.

III. *The Circulatory Organs.*—Early in its course, the plague endotoxin exerts an extremely baneful effect upon the myocardium, in a good proportion of cases causing acute degeneration; the heart muscle becomes soft and friable and can easily be made into a pulp between the finger and the thumb. On the other hand, the heart may continue to work with vigour, but extremely feeble or no pulsation is felt at the wrist, the arteries being almost empty, inasmuch as the loss of capillary tone leads to the accumulation of the blood in the capillaries. The right side of the heart does not get the return of blood, and the left heart has therefore to pound away over half filled or practically empty cavities. And in this fruitless effort it soon exhausts itself. Dr. Dale in his *Oliver-Sharpey lecture* two years ago graphically described this in connection with other infective diseases also. Other changes in the heart are endocarditis, hæmorrhages in the epicardium, pericardium, endocardium and myocardium: dilatation and fatty degeneration; thrombi in the large veins and hæmorrhages in the intima of the blood vessels, especially the venous trunks adherent to the infected abdominal glands. The venous coats degenerate to such an extent that they easily give way and cause very severe hæmorrhages, especially from the iliac and popliteal veins.

IV. *The Respiratory System.*—The most notable pathological changes in the lungs are œdema and pneumonia. Œdema is due to the weakened condition of the circulation as stated

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above: the lungs are engorged and full of serosanguinous fluid. The onset is gradual but it steadily increases until the end. Primary pneumonic plague, and also secondary pneumonia as a complication of other types, present similar features. The term *pneumonic plague* should be restricted to the primary lung infection only. Secondary pneumonia occurring as a complication in other types should not be so called. It is lobular in character in the shape of mottled gray patches surrounded by areolæ of intense congestion. Occasionally, however, a whole lobe is infected. Hæmorrhagic infarcts, infarcts of the *Bacillus pestis* and multiple embolic abscesses, with necrotic foci in the lung tissue, fibrinous pleurisy, hæmorrhages in the parietal, visceral and diaphragmatic pleura, hæmorrhages in the connective tissue of the anterior and posterior mediastina, and infected bronchial glands in the latter are often met with. The larynx is infected; occasionally an inflamed, œdematous condition of the mucous membrane with hæmorrhages beneath the surface and œdema of the glottis have been noted.

V. *The Alimentary System.*—The pharynx is generally infected and the tonsils acutely inflamed when the cervical and parotid glands are involved. Abscesses and hæmorrhages have been noticed in the tonsils; they also form a nidus from which the lungs become infected with pneumonia, as I pointed out some years back. My observation was subsequently confirmed by the Manchurian Plague Commission, who investigated the epidemic of pneumonic plague among the furriers whose trade consists in skinning the marmots—a species of rodent—that are extremely susceptible to plague infection. The œsophagus often reveals punctate and diffuse hæmorrhages; the same are noticeable to a greater degree in the stomach, with or without acute erosion or ulcer. The mucous membrane is usually bile-stained. The intestines from the pylorus to the rectum are studded with hæmorrhages; the Peyer's patches swollen with occasional ulceration. The mesenteric glands are found tumefied, rosy to dark purple in colour; hæmorrhages are seen in the mesentery, in the retro-peritoneal connective tissue, in the loose connective tissue surrounding the viscera, around the deep iliac glands, on the inner aspect of the abdominal wall, and within the recti muscles.

VI. *The Spleen.*—The spleen is in the condition of a veritable acute tumour; the substance is engorged, acutely degenerated, of a deep chocolate colour, almost rusty brown, soft and pulply like a bag of homogeneous jelly. The Malpighian bodies are swollen and distinctly visible. Hæmorrhagic and embolic infarcts with masses of bacilli, abscessses and cysts also co-exist. The capsule is adherent.

VII. *The Liver.*—The liver is swollen and enlarged: there is acute infective degeneration; its substance is soft and friable: necrotic patches in the substance and on the surface are markedly evident and multiple embolic abscesses, and acute fatty degeneration may be present.

VIII. *The Kidneys.*—The kidneys present the aspect of acute parenchymatous degeneration or hæmorrhagic nephritis; the capsule is adherent, with stellate or diffuse hæmorrhages, the cortex thin, the pyramids and the Malphighian capsules swollen; hæmorrhages are present in the pelvis, together with embolic infarcts, abscesses and cysts. At times the kidneys are found embedded in a mass of partly coagulated blood in the cellular tissue around them.

IX. *The Brain and the Meninges.*—There is excess of fluid in the arachnoid sac: the ventricles are full of fluid: the choroid plexuses and the convolutions are œdematous and swollen. Meningitis with effusion of lymph is extremely rare.

X. *The Skin.*—In addition to the points of entrance of the infection and hæmorrhages, there occur cellulo-cutaneous necroses causing enormous destruction of the cutis and subcutaneous cellular tissue. Infection of the skin over the buboes often results in secondary necrosis. When septicæmia is present, an acne-like eruption appears on the face and sometimes overspreads the whole body. Pure cultures of *Bacillus pestis* can be obtained from the lesions: subsequently they either suppurate or dry up.

XI. *The Eyes.*—Keratitis, iritis, iridocyclitis and panophthalmitis with rapid and complete destruction of the eyeballs are not infrequent, especially in septicæmia.

Hæmorrhages have been found in the ovaries. There is acute red degeneration of the marrow of the long bones: and the synovial fringes in joints have been found infected.

Among the rarer pathological changes may be mentioned acute glossitis with suppuration of one half of the tongue: inflammation of the thyroid gland with suppuration of one of the lobes, mammary abscess, ovaritis, epididymitis, periostitis and suppurative arthritis.

Such then are the pathological features of plague. The picture I have presented is not by any means overdrawn. It is the result of a series of carefully conducted autopsies. It portrays the sinister action that the plague endotoxin exerts upon the organs and tissues of the body. It enables us to realise that the external signs we notice do not constitute the whole disease, but that its tentacles are laid deep down in the human organism. It reveals to us the practical futility of our puny efforts to bring about a cure by tinkering with one drug or the other. And finally, it emphasises the need for a serum of a high degree of potency to mitigate its effects, if not ultimately to cure all cases, for after all we can fully appreciate that there is a limit beyond which all human efforts cease to prevail.

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Read this carefully. *Times of India.*

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FRAUD ON CHEMICAL FIRMS.

Special to "Times of India."

PARIS, (By Mail).

So cleverly did a gang of fraudulent patents medicine vendors make up and sell quantities of faked medicines to chemists in Paris and elsewhere in France that the proprietors of the patent medicines themselves when asked by the police were unable to distinguish their own products from the faked ones.

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One of the cheated chemists with the connivance of the police set up a temporary export bureau and gave an order to the suspected persons. They duly delivered the falsified goods only to find themselves on arrival in the hands of the police.—British United Press.

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Blenacrol A. F. D. is twenty times as powerful as mercury subchloride and 800 times as active as **Phenol**; a solution of **Blenacrol** 1|200,000 will prevent the development of the cultures of gonococci, where the **Protargol** universally used has no effect on these same cultures, even when at a strength of 1|500. **The bactericidal action of Blenacrol A. F. D. is therefore 400 times more powerful than that of Protargol** and it is therefore the ideal remedy, in all forms of **Gonorrhœa.**

Blenacrol A. F. D. to be used for douching in the proportion of 1 to 2 tablespoonfuls per pint of sterilised water.

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OPOCRIN PARATHYROID

Ext. Parathyroid 1 mgm.

Dose—1 to 4 Opocrins daily.

Sprue, Tetany, Epilepsy,

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Per bottle of 50 Drages. Rs. 3.

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Normal saline to 3 c. c.
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Ampoules PARATHYROID A. F. D. is the only injectable preparation of Parathyroid on the market and is the last word in pharmaceutical endocrinology.

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Per box of 6 Ampoules. Rs. 3-8.

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ONE GRAMME CREOSAL CONTAINS		
Guaiacol	48	centigrammes
Calcium	15	—
Phosphoric Acid	37	—

50 Centigrammes CREOSAL per tablespoonful
CALCIUM MONOGUAIACOL PHOSPHATE Chemically Pure.

SYRUP CREOSAL A. F. D.
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Coughs, Bronchitis, Influenza, Whooping Cough, Broncho-Pulmonary Affections.

CREOSAL A.F.D. has none of the inconveniences of Guaiacol; it has no odour or disagreeable taste and is readily taken by fastidious patients.

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Indian Medical Gazette.

SEPTEMBER.

COUNTERFEIT DRUGS.

INDIA may be truly described as the land of quacks, of quack doctors, quack medicine mongers, quack dentists, quack opticians, quack faith healers. In Western countries such as the United Kingdom, and above all in the United States of America, stringent laws have been passed against the baneful activities of such persons. But in India, despite Medical Acts and Provincial Medical Councils, they flourish—as do the wicked—like the green bay tree; their activities are unlimited; they appear to be above the law; one has only to open the daily edition of any one of even the leading and most influential newspapers of India to find their advertisements broadcast in its columns. There are newspapers in India which we cannot hope to reform; but the fact that reputable, responsible and highly influential daily papers should lend their columns to advertisements from such quack vendors of "get-well-quick" cures is deplorable. One such "medico," we note, advertises in a most influential Calcutta daily paper that he practises near the south-west corner of the Victoria Memorial in Calcutta. We have looked for his dispensary in vain in that quarter, but presumably it is in some neighbouring *busti*.

The present position, in brief, is one which most vitally affects both the general public and the medical profession in India. Bad enough as it is, it is rendered still worse by the existence of vendors of counterfeit drugs. And this problem affects everybody in India; the medical profession first and foremost, the general public secondly—especially that portion of it which resides in mofussil areas, and out of reach of chemists' shops of first class and reliable reputation, and thirdly—and especially—the reputable, ethical, and well established British, American, and Indian firms of chemists who do a large business in India.

Our protest against this state of affairs has been called for by the results of certain recent prosecutions in the civil courts against vendors of counterfeit drugs.

In the first case Messrs. Parke, Davis and Company, the well-known manufacturing chemists, brought an action against two drug-vendors for supplying a Calcutta practitioner with spurious imitations of Liq. Sedans, Cascara Evacuant, and powdered Taka-Diastase. In the second case, two Calcutta men were proceeded against by Messrs. Parke, Davis and Company, B. K. Paul and Company, Bathgate and Company, and The Bengal Chemical Company, for having in their possession blocks from which could be made very passable imitations of the labels of the firms concerned. Both cases failed on a minor point of law, but Messrs. Parke, Davis and Company and the other firms concerned are to be congratulated on taking the action that they did.

In India at present the vendors of fraudulent drugs can only be prosecuted in a civil court. This involves the issue by a magistrate of a search warrant, a measure which is extremely wasteful of time. That this is so is exemplified in the second of the cases mentioned above, in which one of the accused, scenting that something was in the wind, promptly disappeared somewhere into the *mofussil* and kept out of the clutches of the police while the case was proceeding. In the United Kingdom and in the United States of America we understand that such search warrants are unnecessary. We firmly believe that if the law of this land had been different, and the police had been empowered to make an immediate search of the premises when the matter was reported to them, and to prosecute criminally the delinquent would not have had the opportunity to abscond.

There is therefore an opening here for the application of a concerted, well organised pressure of public opinion.

The matter should not be left as it is, for the general public, the medical profession, and every reputable firm of chemists and druggists in the country are vitally concerned.

In the long run surely the weight of public opinion must tend to bring the law in this country into line with that in the United Kingdom and in the United States of America.

As the law at present stands, apparently the only remedy that the reputable firms have against disreputable ones is to prosecute them one by one as their delinquencies come to light. This, however, costs money. In fact we have lately had an instance where a recognised Indian firm, manufacturing a certain chemical antiseptic, decided not to bring a case against a rival firm who were using what the former claimed to be their protected trade mark, on account of the expenses of prosecution involved in High Court cases. Clearly, therefore, the law needs amendment in this matter. At present the question of a Food and Drugs Act, similar to that which holds in the United Kingdom and in the United States of America, is a matter for each individual province, since all such medical and public health matters are "transferred subjects" under the Montagu-Chelmsford Reform Act. India through her

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Imperial Government can still present a united front to the world and to the League of Nations with regard to precautions in her maritime trade and on the subject of overseas communicable diseases; but the question of fraudulent drugs and chemicals is one for the consideration of the Provincial Legislatures concerned.

We believe that if the Provincial Medical Councils would bring their activities to bear on this subject, the respective legislatures could be prevailed upon to make effective provision in the law, thus rendering it possible to prosecute criminally those responsible for misdemeanours such as we have referred to above. In the meantime, although these two prosecutions have failed, they have laid bare the facts to a greater degree than was previously realised, and have served the purpose of a warning to our readers and others to resist the temptation of buying from sources other than those which they know to be reliable.

A Mirror of Hospital Practice.

RAW CAOUTCHOUC IN THE STOMACH.

By JWALA PRASAD, B.A., M.B.,

House Surgeon, Mayo Hospital, Jaipur, Rajputana.

RAMLA, a carpenter aged 25 years, was admitted to the Mayo Hospital, Jaipur, for treatment for a floating mass in his stomach, which he had first noticed six months previously. His chief complaint was that the tumour caused him uneasiness after a full meal.

On examination, it was found that the tumour disappeared under the ribs on the left side and re-appeared when the patient pressed over that region, a manœuvre which he could carry out successfully as often as required. Holding it with the hand, one could feel that the tumour was a solid, more or less spindle-shaped mass, with a fairly regular surface; about 6½" long by 2½" broad at its broadest diameter, and with no notch in its border. It was freely movable in the left hypochondriac, epigastric, and umbilical regions, without any pulsation or unusual tenderness about it. Various possibilities were thought of, but a definite diagnosis could not be made. An *x*-ray photograph threw no light on the causation of the tumour. It was therefore decided to operate on the patient.

Operation was carried out on the 16th November, 1926. The first fact noticed was that the tumour mass was inside the stomach. On making an incision into the stomach wall a blackish-green mass presented itself, and was easily delivered through the wound. It was not unlike a scybalous mass, made up of distinct masses coalesced together with whitish centres, and it emitted a highly acid odour. Chemical examination showed that the mass was of vegetable origin, consisting of starch, gums, albumin, etc. The origin of the mass however was still a mystery.

When the patient came round from the anæsthetic, he was shown the mass taken out of his stomach, and searching enquiries were made. The patient himself finally gave the right clue. He said that he remembered having previously taken the latex of the banyan tree (*Ficus Indica*), mixed with sugar, as a tonic for about two years.

This was quite in keeping with the findings, because the latex of *Ficus Indica* contains caoutchouc, and this is not affected by the gastric juice. The time factor is negligible, since such patients generally have very vague ideas of time.

The patient made an uneventful recovery and was discharged cured.

A CASE OF SYPHILITIC ENDARTERITIS OBLITERANS.

By P. A. DARGAN,

CAPTAIN, I.M.S.,

Commanding, Indian Military Hospital, Mandalay.

As cases of endarteritis obliterans are somewhat rare, the following notes may be of interest.

The patient was a Madras sepoy, aged 32, with 8 years' service. Except for an attack of malaria in 1920, he had a clean medical history, and denied ever having had syphilis. In November 1926 he sprained his right ankle, and in spite of rest and treatment, continued to complain of pain in the right foot and inability to walk without a limp. An *x*-ray photograph showed nothing abnormal. He next developed two superficial ulcers on the back of the right leg. These healed fairly quickly with rest and treatment: the pain in the foot continued however, and in January 1927 he developed a septic spot on the right great toe. Moist gangrene set in and spread slowly up the toe, accompanied by irregular pyrexia.

The Wassermann test was now undertaken and gave a strongly positive result. Anti-syphilitic treatment was commenced and operation advised. After much persuasion permission for amputation was given, and this was carried out at the site of election below the knee. There was some risk in amputating at such a low level, but pulsation could be felt in the popliteal artery, the gangrene was

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spreading very slowly, and with active anti-syphilitic treatment, it was considered justifiable. There was very little bleeding at the time of operation, but the wound healed well except at one point on the inner side, where gangrene supervened: this, however, did not spread; a certain amount of skin sloughed off, and that part of the wound healed by granulation.

In the amputated leg the veins and arteries were much thickened and there was thrombosis of the anterior tibial and commencement of the dorsalis pedis arteries.

The diagnosis was based on the result of the Wassermann reaction. There was no sugar in the urine, thus excluding diabetes; there was no sign of tuberculosis; thrombosis due to injury (the sprained ankle) would have developed very rapidly, and the climate is against gangrene due to cold. Raynaud's disease develops suddenly and generally affects the fingers before the toes; thrombo-angitis obliterans is most often met with in the jaws, and is not generally accompanied by syphilis.

A CASE OF GOUT IN A BURMAN.

By R. KELSALL, V.H.S., D.S.O., M.D. (Lond.),
LIEUTENANT-COLONEL, I.M.S.

THE following case is perhaps worth reporting, because—as far as my experience goes—gout is very rare amongst Burmans.

On the 3rd June, I saw a Burman, aged 40, who had very extensive signs of gout. The disease had begun five years previously with an acute attack in the left first metatarso-phalangeal joint. Since then, he has had attacks affecting most of the joints of the lower and upper limbs, especially the metatarso-phalangeal joints of the big toes. At the time of examination he had swelling of the first metatarso-phalangeal joint and ankle on the left side, and of the right metacarpo-phalangeal joint. He had very extensive tophi scattered about the fasciæ and tendons of the dorsum of the right foot and of the left foot also. He had very big tophi over both elbow joints and over the head of the right fibula, and a few scattered smaller ones in the fascia lata of the right thigh. He frequently gets tophi over the knuckles. The patient has been a fairly heavy drinker ever since his schooldays, consuming both beer and whisky, and has always been a gross eater.

AN UNUSUAL CASE OF RAYNAUD'S DISEASE.

By BALKRISHNA N. MEHTA, M.B., B.S.,
Juvasingji Dispensary, Bhavnagar.

ASGAR ALI, a Khoja boy, aged 3 years was brought to this dispensary on the 7th December, 1926, suffering from dry gangrene of the fingers of both hands. The history given was that a month previously his left index finger had swollen; then a swelling appeared on the outer aspect of the left foot; three days later the left elbow and the back of the left hand were swollen. A week afterwards purplish spots of various sizes came out all over the body. He then began to get pain in his fingers and toes, which turned blue in paroxysms. Later on, black spots appeared on the four fingers of the left hand and on the middle and little fingers of the right hand. The child had not previously suffered from any

Before Treatment.

definite disease; he lives in insanitary surroundings, has a distaste for green fruits, but a liking for sweets.

The child's mother is a multipara, and her first child died when one month old. The patient under consideration is her second child. There followed two abortions, and fifteen days before the patient was brought to hospital, a female child was born.

On examination the child was found to be emaciated, pale and thin, but apparently intelligent. The head was square shaped with the frontal eminences prominent. The bridge of the nose was somewhat flat. Dark purplish spots of various sizes, which were itchy, were scattered all over the body. The tips of the ears and nose were bluish. Dry gangrene of the distal portion of the left index finger up to the last interphalangeal joint was present.

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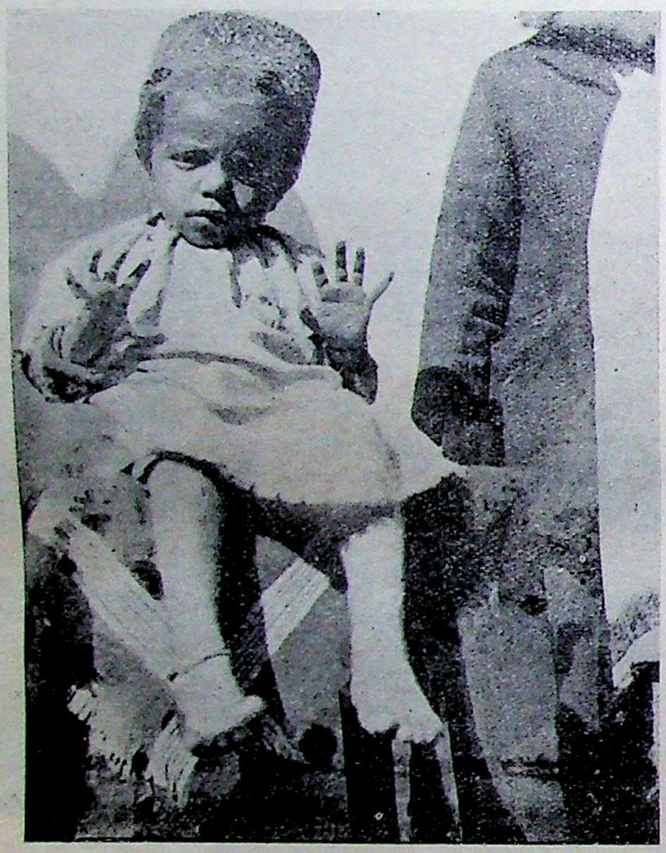
whilst the other fingers of the left hand were gangrenous only at the tips. The middle and index fingers of the right hand were gangrenous at the tips. The thumbs and great toes were not affected.

The hands and feet were in a cyanosed condition up to the wrists and ankles respectively. The swelling on the left foot was still present, though less than before. The swelling on the left elbow had disappeared. The liver and spleen were not palpable; pulse 135; heart sounds feeble. The parents said that the child got fever daily, but no rise of temperature was noted whilst he was in hospital. He



After Treatment.

had passed many sleepless nights, crying with pain. The bowels were constipated; the appetite, which had been impaired at the beginning of the illness, had subsequently improved. Examination of the blood did not show any malaria parasites, whilst urine examination showed nothing abnormal.

Except for the possibility of inherited syphilis from the mother's history and the appearance of the child's nose, there was no definite history of venereal disease in the family.

The following line of treatment was adopted. The gangrenous parts were dusted with boric acid powder, wrapped in cotton wool and lightly bandaged. The hands and feet were wrapped in flannel to keep them warm. By degrees the dead parts sloughed off, leaving healed surfaces behind. The first sloughs separated on the 1st January, 1927. Syrup ferri iodide with magnesium sulphate was given orally for about a month, and quinine in 2-grain doses twice a day for a fortnight. The two photographs show the condition of the boy before and after treatment. Raynaud's disease is said to be of long duration, and although the boy is at present in good health, it remains to be seen whether he will keep well in wet and cold weather.

The case is of interest in that the patient was only 3 years old. Raynaud's disease usually occurs in young women of a nervous diathesis. Taylor says that it is usually first noticed between the ages of 15 and 30, but may occur in childhood. No mention of the disease is made in textbooks on diseases of children. Even in a recent article by Poulton, (*Lancet*, December 1926, p. 1282), it is stated that the most frequent type of subject of Raynaud's disease is a young woman who has suffered from chilblains as a child.

A CASE OF OVARIAN DERMOID.

By RAI SAHIB AMIR SAHAI MATHUR, L.M.P.,
Sardhana, Meerut District.

ON 31st January, 1927, a very interesting case of abdominal tumour was admitted to the Lady Forester Hospital, Sardhana, Meerut District. The patient was a barber by caste, about 30 years of age, very dirty, and much emaciated. Her general health was poor. The tumour was a pedunculated growth, situated midway between the umbilicus and symphysis pubis, hanging from the abdominal wall by a thick pedicle, and of the size of a big melon. It was soft to the touch, reducible to some extent, and irregular in shape. Seen from a distance it looked very much like a ventral hernia, but on examination of its ventral surface various sinuses could be seen, giving out a thin white discharge, muco-purulent in character. Some hair could also be seen growing out from these sinuses. The tentative diagnosis was therefore one of a dermoid cyst, though it had taken one year to travel out of the abdominal cavity, soon after a healthy delivery. The patient was in the habit of suckling her baby over her belly, where its urine and fæces had made local conditions very dirty. Every second or third day she got agonising pains in the tumour, very much like those of a strangulated hernia. These lasted for a couple of hours and could only be controlled by injections of morphia, thus suggesting the presence of some viscus inside the tumour.

Lieut-Col. C. H. Reinhold, I.M.S. took the patient into hospital and operated on her. On reaching the pedicle of the tumour it was found to be adherent all round to omentum. After tying off adhesions the pedicle was

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further traced to the uterus, left Fallopian tube and ovary. Thus the diagnosis of ovarian dermoid was confirmed. After removal of the tumour the gap in the abdominal wall was reinforced by a muscular flap from the rectus abdominis. The patient made a very protracted recovery, as there was considerable suppuration during convalescence. Up to date no hernia has developed in the abdominal wall, and the patient is now in excellent health. Skilful nursing in the Dufferin Hospital, Meerut, was largely responsible for this happy result.

A CASE OF ECTOPIC GESTATION.

By K. C. GHOSE,

Assistant Surgeon, Chaibassa, B. N. Ry.

SITA GOALINI, Hindu female, aged about 30, was brought to the Chaibassa Sadar Hospital by her husband and her mother on the 15th September, 1926, suffering from great distension of the abdomen. The abdomen was markedly tympanitic, and the bowels had not been opened for three days, but there were no other urgent symptoms. The patient stated that eighteen days previously she had felt an unusual pain in the abdomen and had fainted; since then the abdomen had swollen greatly. She is the mother of three children—all living, and with regard to her menstrual history stated that during the previous five months she had missed one or two periods, whilst the others had been irregular and attended by colicky pain.

On admission an enema was given and turpentine stupes applied to the abdomen. A cardiac stimulant mixture was given by the mouth. The same treatment was repeated the next day. The enemas brought away some hard scybala, but they did not relieve the abdominal distension. On the 17th September a black bleb was noticed at the umbilicus with some dark fluid oozing from it. On cleansing the parts with an antiseptic and examining, a fine fistula was discovered leading into the abdominal cavity. On exploring this about 2 lbs. of dark fluid came out, and this relieved the intra-abdominal pressure, but the pulse became very weak, and brandy and other cardiac stimulants had to be given. An antiseptic dressing was applied and the patient kept lying down.

During the next few days the fistula was gradually enlarged with a sinus forceps and finally a rubber drainage tube inserted. There was now some fever, with a continuous discharge of fluid from the fistula. On the 24th a sort of cribriform membrane, about 3" by 4" was passed through the fistula, and on the 4th October fœtal ribs appeared and were picked out. On the 8th October a fœtal hand presented itself and by gentle manipulations with a probe and a long pair of forceps more bones were extracted. The cavity was mopped out with gauze soaked in hydrogen peroxide solution, and this process repeated daily, until no more bones could be felt with the probe. An offensive discharge continued from the cavity for some time, but it gradually ceased and the fistula healed. The patient made a protracted recovery, but was discharged from the hospital in good health on the 30th November, 1926.

Points of interest in the case are:

(1) The patient refused to believe that she was pregnant until she was shown the fœtal bones.

(2) From the fœtal parts removed, it appeared that the pregnancy had advanced to about the 4th or 5th month. In the textbooks it is stated that primary rupture of an ectopic gestation usually takes place in the 2nd month and is attended with severe symptoms. This did not occur in this case, so a primary interstitial or isthmial pregnancy can be excluded. Probably the primary pregnancy was ampullar or ovarian, and the primary rupture was not attended by severe symptoms. The ovum presumably escaped into the broad ligament and a second rupture took place eighteen days before her admission to hospital, attended with severe pain and an attack of unconsciousness. The fœtus had escaped into the abdominal cavity, and had undergone putrefaction, liberating gas which distended the abdomen.

(3) Cases of extra-uterine gestation with survival of the mother (without operation) must be very rare.

A CASE OF PERSISTENT TREMOR OF THE HEAD.

By RAI BAHADUR SHAMBHU NATH MISRA,

Civil Surgeon, Bulandshahr.

A BOY aged about 14 years was recently brought to me for consultation, suffering from continuous and persistent tremor of the head and from hiccup. The history which he gave was that the tremors had started fifteen days previously, without any antecedent disease, and had continued since. He had no history of fever or injury. A week previously he had developed hiccup as well. The patient was a village schoolboy and none of his school or village companions were suffering from a similar complaint.

The parents had taken him to a variety of practitioners, allopathic, homeopathic, *vaids* and *hakims*, without benefit; so finally they brought him to the Sadar Hospital. The onset of the hiccup had interfered very seriously with his sleep and he was reduced in health and could not take proper nourishment.

On examination I found nothing wrong with the boy, except a condition of tongue-tie. He was quite unable to put out his tongue, though he could speak clearly. The relatives stated

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that he had been operated on twice previously for this condition, but, disregarding their remarks, I operated on him the next morning under a general anæsthetic.

Both the condition of head tremor and hiccup immediately cleared up. I kept the patient under observation for a further period of two days, but there was no recurrence of the symptoms. The case might be regarded by some as hysterical, but it would appear rather to be due to reflex irritation.

A CASE OF SCORPION STING.

By M. ASLAM OMAR, L.M.P.,

Gonda, U. P.

DURING the third week in June last a child, aged about two years, was stung in the left leg by a scorpion at about 7 p.m. According to his parents' statements, by 11 p.m. he was laid up with rather high fever, which had set in with chilliness, and was breathing very rapidly. He was brought to me the second morning after having been stung. I found his temperature to be 101·4°F., the pulse very weak and 160 per minute, the respirations rather noisy and 80 per minute. On auscultation harsh bronchial breathing was audible over both lungs, and the heart sounds were almost inaudible. There was much lividity of the face and the little patient was in a condition of extreme prostration.

I gave him a subcutaneous injection of digitalis and strychnine, and prescribed an antiphlogistic expectorant mixture with sal volatile. Improvement was gradual and steady, and when he was next brought to me on the eighth day after having been stung, the lungs were clear, and the temperature almost normal.

The case appeared to have been one of acute congestion of the lungs due to absorption of toxins from the site of the scorpion sting.

A CASE OF IRON RING INCARCERATED AROUND THE ROOT OF THE PENIS.

By C. S. SHARMA, L.M.P.,

Medical Officer, i/c City Dispensary, Farrukhabad, U. P.

RAM SINGH, aged 40 years, was brought to the City Dispensary, Farrukhabad, on the evening of the 20th May, 1927, with an iron ring, 3/4" broad and 3½" in circumference incarcerated around the root of the penis. The ring had been applied by the patient three days previously—according to his own explanation to overcome libido, because he wished to become a *sadhu*. Shortly afterwards the penis became œdematous and the ring could not be removed.

At the time of admission the patient's penis was enormously enlarged and œdematous, of a dark colour, measuring 6" in circumference at its root and bordering on a gangrenous condition. The iron ring was sawn through with a goldsmith's *reti*, previously sterilised by boiling, since no ordinary surgical instrument was capable of cutting it. The patient could pass urine in drops and with some difficulty. The penis had become ulcerated at its root, where the ring had compressed it, and free incisions had to be made to reduce the œdema and swelling. At the time of writing the patient is making good progress, all danger of gangrene and sloughing having been averted.

My thanks are due to Rai Bahadur Dr. Saroop Narain Mathur, Civil Surgeon, Fategarh, for permission to publish the notes on this case; also to my head compounder, M. Wazeer Ali, for the skilful aid which he gave me in removing the ring.

A CASE OF MEDICO-LEGAL INTEREST.

By M. UMAR, P.M.S.,

Officiating Surgeon, Bijnor, U. P.

SODAL, son of Mohan Chamar, of Qaziwala District, Bijnor, aged 12 years, was brought to hospital about 6 p.m. on the evening of the 26th May, 1927, by his father. The father stated that the boy had climbed over a tree trunk, leaving his stick balanced against the trunk. He had slipped and fallen on to the stick, which had entered the anus.

On examination there was no external injury on any part of the body, but there was a superficial tear on the margin of the anus and some slight discharge from it. The patient's abdomen was slightly distended, but there was no vomiting. The patient lay on his back with his knees drawn up. The pulse was weak and rapid. Respiration was mainly thoracic in type; the temperature 97°F.; the extremities cold; and the face was pinched and drawn with typical facies hippocratica.

The patient's relatives absolutely refused to permit operation, and all that could be done was to keep the patient quietly in bed in Fowler's position. I am against giving morphia or opium in such cases, since it conceals the symptoms and in addition gives a false sense of security, especially to the relatives. The patient died at 3 a.m. on the 27th May, 1927. A post-mortem examination was performed, and the findings were as follows. In order to secure the rectum intact I removed the coccyx and sacrum (as in the trans-sacral or Kraske's operation) *en masse*.

Large intestine.—On opening the rectum the first mark of injury was found 5½" above the anal orifice. On the external surface of the rectum there was a gangrenous patch, 2" by 1", four inches above the anus. The rest of the gut was normal.

Small intestine.—Two feet of ileum above the ileo-cæcal valve were found to be gangrenous. A few coils of the jejunum also

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showed gangrene. The rest of the gut was normal.

Abdominal cavity.—About 6 ozs. of pus were present in the abdominal cavity. The spleen—as is often the case in India—was enlarged.

The membranes of the brain were congested. The left side of the heart was empty. There was a clot of blood in the right side of the heart. Some dark coloured fluid was present in the stomach, and only a little urine in the bladder. The child had clearly died of peritonitis, due to the injury described.

The story given by the father was quite incredible. The probability is that the boy was grazing his cattle in somebody else's field, when the owner of the field came up and a quarrel ensued. The owner of the field probably inserted the stick into the boy's anus by way of punishment.

TORSION OF THE SPERMATIC CORD AND SPONTANEOUS RECOVERY.

By A. VISWANATHAN, L.M.P.,

Central Jail, Tharrawaddy, Lower Burma.

A KAREN sepoy, bugler of the military police, Papun, was brought to the Civil Hospital, Papun during a night in January 1925. He had been quite well during the day time except for constipation lasting for a couple of days. He sounded the night roll-call bugle at 8 p.m., at the end of which act he began to feel increasingly severe pain in the abdomen and scrotum. I observed him to be in the following condition:—

(1) Temperature 101°F., pulse about 120, rapid and somewhat wiry.

(2) Abdomen rigid, and extremely tender to touch: legs bent up to relax the abdominal muscles.

(3) No swelling in the groins, but both the cords were felt to be enormously enlarged towards their testicular ends. The epididymis on both sides was also swollen and tender.

(4) There was vomiting twice during a period of 15 minutes.

The case was provisionally diagnosed as torsion of the spermatic cord. But keeping in mind the other causes of acute abdomen, the hospital nurse was asked to get ready instruments for abdominal section and herniotomy. Meanwhile a copious warm water enema was given which resulted in the expulsion of massive balls of old fæces. After this his pain was greatly relieved, a hot water bottle was applied to his groins, the idea of operation being given up temporarily.

Early next morning the swelling and tenderness of the cords subsided practically, except for some dragging sensation in his testicles. One ounce of castor oil was given.

He was discharged cured after a week. It was, of course, recommended that he should be taken away from his appointment as a bugler.

This is the first case of torsion of the spermatic cord which I have seen during my 8 years of service in Burma. I have not read any recent literature regarding the frequency of this condition and believe it is not of common occurrence. Rose and Carless say that the ætiology of this condition is scarcely understood, but that it is associated with late descent of the testes, and with twists and strains of various kinds. In the case here recorded bugling had been the exciting cause, while constipation might have predisposed towards it. The cord is usually fixed in the inguinal canal, but is free as a rule in all cases of patent tunica vaginalis, in which condition it can be more easily twisted. This anatomical abnormality may be one of the chief predisposing causes of the torsion of the cord.

As regards the termination of the condition, few authors in surgery mention spontaneous recovery, while all mention gangrene of the testes and cord. This case is an instance of spontaneous recovery.

Uncommon as the condition is, it is well to remember it as one of the causes of acute abdomen. Before undertaking any operation for untwisting the cord in its early stage or for castration in its later stage it is worth while trying the effects of an enema.

A CASE OF IMPERFORATE ANUS.

By S. N. MUKERJI, F.R.C.S.,

MAJOR, I.M.S.,

Civil Surgeon, Chittagong.

A NEW-BORN male child 3 days old was brought to the General Hospital, Chittagong, for imperforate anus on the 23rd July, 1925. I operated on the child at once under chloroform. It took about 45 minutes to find the rectum. It was high up in the pelvis. I had to dissect to the depth of more than an inch to find it. I failed to bring the rectum down to the skin margin at the time. The child was given one drachm of olive oil daily for the next three days. He was fed on sterile water for two days after operation, and put on mother's milk on the third day. He was getting on well when the parents took him away. But they promised to bring him later on for further operation. I saw the child again after 14 months. He was a healthy child. He was doing so well that the parents were not anxious even then to bring him for further operation. The part was examined. The opening was forming into a constriction. It was impressed on the parents to bring him soon to hospital for further operation. I had opportunities of operating on a number of cases of imperforate anus as Resident Surgeon to the Medical College Hospitals, Calcutta, but unfortunately I could not follow them up. I never saw one live when operated on so late after birth. I am reporting the case as I consider it to be very

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encouraging. The child is alive to-day and healthy.

[*P. S.*—We requested Major Mukerji to try and trace his patient in July 1927. Unfortunately, he reports that the child and his mother both died of cholera during a local epidemic in May, 1927.—ED., *I. M. G.*]

TWO INTERESTING CASES: ENORMOUS OVARIAN TUMOUR; ENORMOUS ENLARGEMENT OF THE LIVER FROM SECONDARY CARCINOMA.

By MRS. S. MOZUMDAR, M.B. (Cal.), F.R.C.S. (Eng.), L.M. (Dub.),

Honorary Physician and Surgeon, Barh Subdivisional Hospital, Patna District.

Case 1.—A middle-aged woman, about 40 years of age, came to the out-patient department with an enormous abdominal swelling of four years' duration, and complaining also of acute pain in the abdomen for the previous two days. The patient's distress was such that only a rough and rapid examination could be made, and actual measurements could not be taken; but the enormous size of the swelling can be judged by the fact that, as the patient was sitting on the ground, the tumour was also "sitting" on the ground, fully one and a half feet in front of her.

A diagnosis of ovarian cyst was made, but as the cyst was too large to be taken out entire through the longest abdominal incision, and also to relieve the urgent distress of the patient, the cyst was tapped, prior to operation. On tapping, more than 70 pints of a dark, thick fluid came out and the cyst collapsed, indicating its unilocular character. The patient stood the shock of this emptying of an enormous cyst of four years' standing fairly well, but pain persisted for the next two or three days. This fact, plus the acute pain with which she had been admitted, made me suspect a certain amount of torsion of the pedicle of the cyst. However, the pain gradually subsided, and an interval of nine days was allowed to give her time to recoup and regain strength a little.

Operation.—Although I expected to find a certain amount of adhesions, indicated by the prolonged history and the attacks of pain referred to, I encountered a hopeless state of affairs inside the abdomen. The peritoneum was converted into a dense fibrous sheet of fully one-third of an inch in thickness—so much so that I mistook it at first for the cyst wall itself. On getting through the full thickness of the peritoneum at last, I found that there was no free peritoneal cavity left, it being completely occluded by dense fibrous union between the cyst wall and the peritoneum. On attempting to break down these adhesions, the bleeding was so copious that I realised the impossibility of trying to remove the cyst. The adhesions were not limited to the mid line only; though she had only been tapped once in this hospital, she had been cauterised by village quacks outside, as is frequently the case with such patients. I exposed about one square foot of the surface of the cyst all round the line of incision, but found the adhesions just as dense outwards as towards the mid line. When one realised that the forcible separation of these adhesions would have left over ten square feet of bleeding surface, the hopelessness of removal of the cyst became apparent.

So, before closing the abdomen, I decided to draw off the fluid which had accumulated in the meantime. Finding it impossible to push in a trocar with the cyst flaccid and the patient in the recumbent position, I made an incision in the cyst wall. In order to reach the cavity I had to cut through three-quarters of an inch of dense, solid, fibrous tissue, which composed the cyst wall. When cut this tissue retracted, just as does a fibromyoma of the uterus.

The interest of the case lies in the complete occlusion of the peritoneal cavity, so that one could not get inside it at all. Also, such patients, with a long history of ovarian tumour and with loss of so much body fluid, are so debilitated by the time that they seek surgical aid that any heroic attempts at extensive breaking down of adhesions—leaving enormous bleeding surfaces, together with possible tears of adherent intestine behind and below in the pelvis—are out of the question.

After the patient recovered from the operation, I thought of trying the vaginal route, to see whether I could get at the pedicle of the cyst and tie the ovarian vessels; for I believe that, failing excision of the cyst, the rate of secretion of fluid would be diminished very considerably by this procedure, whilst sloughing of the sac would be prevented by the collateral blood supply from the adherent peritoneum. But, as I was not sure of the success of the operation—for the adhesions would most likely be firmer in the pelvis where the mischief originated—and as the patient refused another operation, I discharged her from hospital.

Case 2.—A middle-aged woman (they never know their age) came to hospital complaining of dysentery of only one month's duration. As often happens in a crowded out-patient dispensary, I almost disposed of the case by ordering a course of emetine injections, when, very casually, I put my hand over her abdomen and was very surprised to find a very big and solid swelling. On getting her on the table for examination, I found that the swelling was an enlarged, hard, nodular liver, of enormous size. Its measurements were:—

Below; right margin; it disappeared below inside the pelvis, so that its edge could not be felt.

Below; mid line; three finger-breadths above the symphysis pubis.

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Below; left margin; three inches below the costal margin in the left anterior axillary line.

Girth of the abdomen; 35½ inches. The protuberance of the liver was 1¾ inches at its highest convexity, i.e., it projected 1¾ inches beyond and in front of the sternal plane.

The diagnosis at this stage lay between an amœbic abscess and a hydatid cyst of the liver. The lumpy, nodular and hard feel of the liver surface, plus the absence of pain, tenderness, adhesions and fever pointed to a new growth rather than an abscess. The stools were twice examined for amœbœ, with negative results. Two injections of emetine were given, also without effect on the swelling.

On the third morning after the patient's admission I asked to see her stools myself and found a large admixture of fresh red blood with very little mucus in the stool. This having roused my suspicion, I made a rectal examination and found, as I had suspected, a large ulcerated growth low down in the rectum and all around its wall. It bled easily to the touch and was very friable. The upper limit of the lesion could not be reached with the finger. There were no palpable lymphatic glands in the inguinal region, although the anal canal was encroached on by the disease. The lumbar glands could not be palpated, as practically the whole abdomen was filled by the enormous liver, which was, as yet, fairly movable and free.

The diagnosis now was obvious—a case of carcinoma of the rectum with secondary deposits in the liver. But the point of interest in this case is the tremendous size of the liver, with a history of only one month's enlargement. Of course it is possible that the patient overlooked the abdominal enlargement for a long time, but she seemed very definite on the point, and as she was a very intelligent woman, I felt inclined to believe her statement that the "dysentery" had preceded the abdominal enlargement.

It is just possible, but not likely, that the conditions in the rectum and liver were quite independent lesions. Of course a Wassermann reaction should have been done on the case, and also an exploratory laparotomy. But the former is not possible in these outlying mofussil dispensaries, whilst with regard to the latter, it did not seem safe to anæsthetise unnecessarily a patient with so damaged a liver. In my opinion, however, there is no doubt that the condition of the liver was secondary to the malignant growth in the rectum. The total absence of tenderness and pain in the liver, also the hard, lumpy, nodular feeling of its surface all pointed to malignant growth.

The patient was extremely anæmic. This fact, together with the extensive growth in the rectum, plus the enormous involvement of the liver made any operative interference hopeless, and the patient was discharged as inoperable.

Current Topics.

Calcium Carbonate in the Treatment of the Gastric Hyperacidity Syndrome and in Gastric and Duodenal Ulcer.

By A. S. LOEVENHART, M.D.,
and
L. A. CRANDALL, M.S.

(*Journ. of American Med. Assocn.*, May 14th, 1927, pp. 1557—1559.)

THE use of appropriate antacids in the treatment of the gastric hyperacidity syndrome and in gastric and duodenal ulcers is discussed in an interesting paper by Loevenhart and Crandall. After stating that "the ideal antacid is a substance that may be taken by a patient over a long period of time in amounts sufficient practically to maintain gastric neutrality without producing deleterious by-effects," the authors pass on to a critical examination of the various drugs in common use.

(1) *Sodium bicarbonate*, the most widely employed antacid, is undesirable for the following reasons:—

(*a*) Relief from pain is quite temporary.

(*b*) It is irritating in the concentration often used by patients.

(*c*) It is soluble, so that it is impossible to regulate the concentration in the stomach, and thus assure the minimum amount required to neutralise the gastric acidity. The patient either receives too much or not enough in nearly every case.

(*d*) An excess may cause alkalosis, altered concentration of the inorganic constituents of the blood, an alkaline urine, and occasionally the precipitation of crystals in the urine which traumatize the urinary tract.

(2) *Magnesium hydroxide and carbonate.*—Both have the disadvantage of being intestinal irritants and may cause undesirable catharsis.

(3) *Bismuth subcarbonate and subnitrate.*—Neither of these salts of bismuth is an antacid, they are merely inert insoluble powders which on administration protect ulcerated surfaces. The formation of bismuth sulphide with consequent darkening of the stools is advanced by the authors as an additional contra-indication to their use in that patients suffering from gastric and duodenal ulcers are frequently neurotic and the discoloured stools may suggest the possibility of hæmorrhage.

(4) *Calcium carbonate.*—This is the drug of choice in that (*a*) when suspended in water it is neutral in reaction; (*b*) it is, therefore, only a "potential" alkali but it neutralizes the gastric acid, forming calcium chloride and carbon dioxide; (*c*) it can be given almost *ad. lib.* and if an excess is taken it passes out in the fæces; (*d*) it apparently has no effect on the activity of the bowel except that, if taken in excess, it increases the bulk of the stool; (*e*) when taken in excess it will coat over ulcerated areas and may in this manner protect them from the action of irritants.

The authors recommend that it be taken in tablet form, each tablet containing 10 grains of calcium carbonate and 1|40 minim of oil of cinnamon—the latter is a pleasant flavouring and carminative agent.

Irradiation of Diseased Tonsils.

By J. COLEMAN SCAL, M.D.

(*Med. Journ. and Record*, December 1st, 1926.)

THIS article describes a new method of treating tonsillar hypertrophies by means of removable platinum radon seeds, giving detailed reports of a series of cases where tonsillectomy was contra-indicated for different reasons, and illustrating the application of the technique to varying pathological conditions.

To carry out the application of the seeds, a new implanter is used which is illustrated and described in the article.

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As the pain of implantation and removal is practically *nil*, at no time is any anæsthetic required, there is no need of hospitalization, nor is there disability of any kind. The total absence of shock is a great advantage in inoperable cases.

By means of the implanter the operator is able to place one removable radon seed in the centre of a tonsil so that radiation is distributed equally throughout. The radon seed used is filtered by 0.3 mm. of platinum. This filtration cuts off the caustic *beta* rays, thus doing away with all possibility of burning with consequent necrosis and sloughing.

When the instrument is withdrawn after implantation the seed is left imbedded in the tonsil with a 2-cm. length of thread protruding from the portal of entry. This short thread does not in any way inconvenience the patient, nor cause the slightest interference with function. At the end of four days the seeds are easily removed by grasping the thread with forceps.

The point of the trocar is so fine and the seed so small that very little trauma is done to the tonsil.

The amount of radiation can be measured with accuracy and the applicators located with such exactness as to insure equal and complete distribution throughout the tissues. Only one treatment is necessary, a fact much appreciated by the patient. Systemic reactions of any kind never occur. The attached thread, making the seed easily removable when its period of service is over, does away with an objectionable foreign body being left in the tissues—a drawback to the bare tube method. The author concludes that in the implantation of removable platinum radon seeds we have at present an adequate substitute for tonsillectomy in those cases where surgery is, for any reason, contra-indicated.

The technique and method described in the article have been evolved by Dr. Joseph Muir of New York.

Irradiation of Vesical Neoplasms by Removable Platinum Radon Seeds : Description of New Instruments Designed to Facilitate their Employment.

By JOSEPH MUIR.

(*Journ. Urology*, January 1927, p. 53.)

AN improved method of treating neoplasms of the bladder by means of removable platinum radon seeds is described in this article.

Using the removable platinum radon seed it is possible to obtain scientific accuracy of the dosage delivered. Radiation is directed not only to the growth itself, but to the tissue surrounding it, in order to catch the mitotic cell. The placement of the radio-active units is made so that the "zones of potential tissue change" from each source do not overlap. The "zone of potential tissue change," or the amount of tissue that one seed can take care of when implanted alone, and also when two or three centres are used so that intervening cells are subjected to cross firing, is described. The theoretical exposure has been proved by clinical results.

Using the removable platinum radon seeds it is possible are we able to deliver accurate dosage, but because of the platinum screenage all caustic rays are eliminated, and necrosis and sloughing with intense shock to the patient obviated. The fact that platinum radon seeds are easily removed through the cystoscope after the required amount of radiation has been delivered makes this the method of choice since no foreign body is left in the tissue after treatment.

The technique of application is fully described and illustrated. A point of great importance in using the removable platinum radon seeds is that after the first seed has been implanted through the cystoscope, its thread protruding from the portal of entry of the seed in the tissue serves as a landmark and guide for the placement of successive seeds, so that the accuracy of placement of seeds through the cystoscope is greatly increased. Also, should a seed be incorrectly implanted, it may be removed and re-implanted.

In view of the highly simplified technique as described, the treatment of vesical neoplasms by implantation of removable platinum radon seeds can be accomplished with as much scientific accuracy as any other urological procedure.

The Status of Intravenous Therapy.

IN the issue for June 4th, 1927, p. 1798 of the *Journal of the American Medical Association* there appears the report of a special committee appointed by the Therapeutic Research Committee of the Council of the American Medical Association on Pharmacy and Chemistry on the subject of intravenous therapy in general. The members of the Committee were Reid Hunt, M.D., Boston; W. S. McCann, M.D., Rochester, N. Y.; L. G. Rowntree, M.D., Rochester, Minn.; Carl Voegtlin, PH.D., Washington; and Cary Eggleston, M.D., of New York. Their report sums up the present position with regard to intravenous therapy so fully that we take the liberty of reproducing extensive abstracts from it. Its purview does not take into account such drugs as the quinine and antimony compounds which are used by the intravenous method so largely in this country; but on the other hand, the general rules given for intravenous medication will be of special interest to our readers.

"The intravenous administration of remedial agents," they write, "is a procedure that deserves to be placed on a much more secure and rational foundation of scientific knowledge than is at present the case. Under certain circumstances this form of therapy, when carried out properly, has proved to be of the greatest value. The conditions in which its value has been established, along with the details essential to its safe and effective employment, should be known by all physicians. The dissemination of this knowledge is deemed one of the most important functions of the Committee.

While recognizing and urging the value of intravenous therapy under appropriate conditions, it is equally important to emphasize the fact that the injection of any foreign substance directly into the human blood stream is always a serious undertaking. There are many conditions in which the risks inherent in intravenous therapy may greatly outweigh the real or supposed advantages which are claimed for the procedure. This is particularly likely to be the case with the more or less potent drugs. There is also a growing tendency on the part of many to resort to intravenous injection under conditions in which it is of dubious value, if not potentially harmful. Finally, there are circumstances in which the dangers of intravenous medication are well recognized, but in which they must be accepted for the sake of the probable advantages to the patient, just as surgical operations must be performed at times in the face of obviously grave risks. The Committee plans to consider each of these groups of problems and proposes to publish a series of reports on various aspects of the subject. The Committee also wishes to lend its active support to further researches which will promote more accurate understanding of the scope and limitations of the method.

This introductory report will present a general review of the more or less well established indications and contra-indications for intravenous therapy. A brief outline of certain of the more important points in the technique of the preparation and injection of the solutions will be given, and the major dangers will be enumerated."

Indications.

1. As an emergency measure, when rapidity of action is paramount. In cases of shock, toxæmia and hæmorrhage, saline or glucose infusions or less frequently infusions of gum-glucose or Locke's solution are often of great value in restoring blood volume and in overcoming dehydration.

To combat severe acidosis, the infusion of saline sodium bicarbonate or glucose solutions, or combinations of them, may be life-saving.

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In diabetic coma the intravenous administration of insulin, with or without the simultaneous infusion of glucose, may prevent untimely death.

Calcium chloride may be given by the vein in severe forms of tetany.

Increased intra-cranial pressure may be relieved by the injection of hypertonic solutions of sodium chloride.

Acute circulatory collapse sometimes responds to the slow injection of weak solutions of epinephrine in physiologic sodium chloride solution.

Occasionally, the intravenous administration of ouabain or of amorphous strophanthin will restore patients with cardiac failure when almost moribund.

In the malignant forms of malaria it is the accepted practice to administer the first few doses of quinine by vein.

Neglected late and severe cases of diphtheria often demand the intravenous use of antitoxin, and sometimes respond to it favourably.

2. When greater intensity of action is required than can be secured by other methods. Many antitoxic and immune serums are absorbed slowly from the subcutaneous or intramuscular tissues, and their intravenous administration may be demanded by the severity of the disease. In this group are the antitoxic serums for diphtheria and tetanus, antimeningococcus serum, antistreptococcus serum, antipneumococcus serum and pneumococcus antibody.

Nonspecific proteins, which are used for the purpose of inducing protein shock, are often best given by vein, as in the case of typhoid vaccine in the treatment of chronic arthritis.

3. When the volume of the dose is large. This is frequently the case when saline or glucose solutions, serums and serum substitutes are required. Whenever volumes of 100 c.c. or more are required, intravenous administration is preferable to intramuscular or subcutaneous, except in the case of simple hypodermoclysis.

4. To avoid irritation or destruction of the tissues at the site of injection. This is the chief reason for the practice of injecting arsphenamine and neo-arsphenamine intravenously, and is an important reason for this mode of administration for quinine, the dyestuffs, colloidal metals, alkali and other irritant agents.

5. To secure direct action within the blood stream. Intravenous injection is practised in the case of quinine in malignant malaria and of the dyes and colloidal metals in sepsis with the purpose of securing an immediate, direct destructive action on the infecting organism within the blood stream. It is doubtful whether this purpose is accomplished to any significant degree, as most agents leave the blood stream very rapidly. It is also equally doubtful whether this practice is based on a correct conception of the pathologic conditions present in sepsis. Recent evidence suggests that in sepsis the organisms would be best attacked in the focus from which they are being liberated, rather than during the brief period of their presence in the blood stream.

When intravenous therapy is really indicated it should not be left as a last resort, but the patient should be given the benefit of its prompt employment.

Contra-indications.

1. In the absence of the foregoing indications, intravenous therapy is rarely justified if the desired effect may be secured by the more usual modes of administration.

Thus, hypodermoclysis is usually effective for the relief of dehydration; the intramuscular injection of sulpharsphenamine is probably as effective in the control of syphilis as is the use of arsphenamine by vein, and very few cases of heart failure are so urgent that they cannot be brought under control sufficiently rapidly by the intramuscular injection of ouabain, strophanthin, or the oral administration of appropriate doses of digitalis. When ouabain or strophanthin is injected intramuscularly, the site of the injection should be massaged vigorously for about ten minutes. This minimizes the local pain which might otherwise result and hastens its absorption. The usual dose is from 0.25 to 0.5 mg. The difference in the rapidity with which the therapeutic action of most agents can be secured by the several modes of administration is only occasionally of sufficient importance to warrant resort to the more difficult practice of intravenous administration, the promiscuous use of which may be dangerous.

2. The risks of intravenous injection frequently outweigh its probable benefits in: (*a*) greatly weakened patients; (*b*) the aged; (*c*) at times, patients with hypertension, arteriosclerosis or heart disease; (*d*) patients known to be, or suspected of being hypersensitive to one or more proteins, such as patients with asthma, hay-fever or urticaria, and (*e*) patients known to have drug idiosyncrasy.

3. The following classes of agents are generally unsuitable for intravenous use: (*a*) substances of complex composition; (*b*) imperfectly purified substances; (*c*) substances which are definitely acid or markedly alkaline in reaction; (*d*) substances which do not yield clear solutions in aqueous mediums, or which fail to yield satisfactory colloidal solutions; (*e*) emulsions of fats and oils; (*f*) suspensions, unless extremely fine and very dilute, and (*g*) very potent pharmacologic agents, and those which have several different major actions.

Technique.

One should not resort to intravenous therapy until one has thoroughly familiarized oneself with every detail of technique, the observance of which may enhance the comfort and safety of the patient. The matter of technique is of paramount importance, and many of the disturbing reactions and dangers of this form of therapy can be minimized by proper attention to details. Space permits only a brief general review of the more important matters in this report.

1. The solutions: Distilled water frequently contains a pyrogenic substance which is the product of its contamination with living organisms carried over in the process of distillation. It is safer to employ only water that has been properly distilled within a very few hours of its use. The water should be distilled and collected in an apparatus made entirely of glass to avoid chemical contamination. The ordinary commercial distilled waters should never be used if they can be avoided.

2. The agents employed: In general, only such drugs and other agents should be used as are of established purity; and when this cannot be determined by chemical examination, it should be checked by suitable animal tests. Some samples of glucose, supposedly chemically pure, were found unfit for intravenous injection.

3. Sterility: This should be insured by re-sterilization of the finished solutions in the autoclave immediately after their preparation unless heat is injurious to the ingredients.

4. Decomposition: Special attention must be given to the prevention or correction of decomposition during the process of sterilization. Heat, for instance, converts a part of sodium bicarbonate into the much more alkaline and caustic carbonate. This may be corrected after final sterilization by passage through the solution of sufficient carbon dioxide to insure re-conversion into bicarbonate. In other instances the sterile, dry drug may be dissolved, under conditions of the strictest asepsis, in fresh distilled water at the time of use. Some substances, such as ouabain and strophanthin, may undergo complete destruction and become inert when their solutions are put up in soft glass ampules, owing to the liberation of alkali from the glass. When using commerical solutions one should be careful to make sure that they are preserved in a suitable amphoteric medium or are marketed in "hard glass" ampules.

5. Reaction: All solutions should conform as closely as possible to the reaction of normal blood, which is slightly on the alkaline side of neutrality—pH 7.4. The use of "buffer" salts for the control of the reaction of solutions for intravenous injection has been suggested, but they are not to be recommended unless it is known definitely that they do not react with the therapeutic agent that is to be employed. When the solution of a drug cannot be brought to approximately the normal alkalinity

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of the blood, it should be administered in small amounts and injected very slowly. An exception to the foregoing occurs, of course, when the object is to alter an abnormal blood reaction, as in the use of alkali in acidosis.

6. Isotonicity: Solutions should generally be nearly isotonic with the blood, especially when the volume to be injected is at all large. The important exceptions are the use of hypertonic solutions for the purpose of influencing the total blood volume, intra-cranial pressure and other conditions in which the abstraction of water is desired.

7. Rate of Injection: Intravenous injections should always be given slowly. Rapid administration introduces several hazards: (*a*) the danger of overwhelming the heart and circulation with too great a volume of fluid; (*b*) the risk of breaking down such compensatory mechanisms as those which maintain the reaction of the blood, its osmotic tension, its viscosity and the like within the very narrow limits of normality, and (*c*) the likelihood, especially in the case of active drugs, of having them carried to the heart, the central nervous system or other vital structures in dangerously high concentration. It is often advantageous to resort to intermittent injections, permitting satisfactory dilution by the blood stream and allowing the heart time to empty itself of the more concentrated solutions.

8. Temperature: The temperature of the solution to be administered should be approximately that of the body, especially when a considerable volume is to be injected. This often necessitates the use of special apparatus to keep the solution from cooling during the course of injection.

9. Miscellaneous: It is scarcely necessary to mention the need for strict asepsis and the sterility of all apparatus employed. The technique of asepsis should be as rigorous as that for any other surgical operation. If rubber tubing is used, as in the gravity method, it should be selected to insure its freedom from the liberation of toxic substances, especially antimony compounds. The needle should be as small as will serve in each instance; it should be extremely sharp, and the point should have a very short bevel to prevent injury to the vein or its complete transfixion. Meticulous care should be observed to make sure that none of the solution is allowed to escape into the perivascular tissues, and it is often advisable at the close of the injection of an irritant agent to wash out the vein by the injection of a small amount of physiologic sodium chloride solution.

Dangers.

Many of the more obvious dangers have been mentioned in the review of technique and the means of avoiding them suggested. There are other dangers less obvious and far more difficult to avoid. These are the risks which are inherent in the introduction of any foreign substance into the blood stream in which the integrity of a multiplicity of chemical, physiologic and physico-chemical balances must be maintained as essential to life. When one considers the nicety with which these balances must be preserved, the grave consequence of their disturbance and the relative ease with which they may be upset, it is truly remarkable that there are not many more serious accidents than seems to be the case. However, if intravenous injection is to maintain its rightful place in therapeutics, it is essential that its development shall proceed deliberately along scientific lines in the laboratories of pharmacology, physiology and biochemistry, and in properly equipped hospitals. At the moment, various agents are being injected into the veins of man in a haphazard, empiric and irrational manner. Continuance of this practice will surely bring the method into a degree of disrepute comparable to its present unwarranted popularity, and much of value will be lost thereby, for a time at least.

II. INTRAVENOUS ADMINISTRATION OF WATER, SALTS AND GLUCOSE.

There is a legitimate and growing field for intravenous treatment, and the indications and contra-indications for it are becoming more sharply defined. This form of treatment is considered so important in the Mayo Clinic that it is handled by a special committee appointed to consider matters such as when and where it shall be employed, the materials to be used, the purity of drugs, the adequate daily supply of distilled water, and the methods of preparation and administration. Chemical studies of the blood, and medical consultation usually precede the employment of the intravenous method. All of the solutions are freshly prepared with meticulous care and given slowly at body temperature at the rate of from 10 to 20 c.c. a minute. When due care is exercised in the selection of cases and in the preparation and administration of the solutions, the effects are held by this group to be most satisfactory.

Despite the dangers attending the intravenous use of drugs, water, salts and glucose are given in considerable amounts in this manner for various disorders. These substances represent normal body constituents, but it must be remembered that normality in the body depends on the maintenance of the equilibrium or proper relationships of various substances. In health, the volume and composition of the blood are kept practically constant by a complicated but extremely effective mechanism. In certain diseases, however, the blood is changed in volume or composition, and the addition to it of water, salts or glucose may prove of definite benefit to the organism. Obviously, except in emergencies, these substances should be given by mouth so long as this method of administration is feasible and compatible with normal absorption. If this fails, proctolysis and hypodermoclysis should next be considered. However, if the need is urgent and other channels of administration are precluded, the administration of sodium chloride or of glucose solution intravenously is justified.

Indications for Intravenous Medication.

The main purposes of the intravenous use of saline and glucose solutions are: (1) to increase blood volume, restore failing circulation and combat dehydration; (2) to combat toxæmia; (3) to supply glucose or energy; (4) to combat acidosis; (5) to supply certain salts specifically indicated, and (6) to effect dehydration, as in increased intra-cranial pressure.

Increase of Blood Volume, Restoration of Failing Circulation and Combating Dehydration.—The intravenous injection of glucose and salt solution is indicated in cases of shock to restore failing circulation, increase blood volume and restore fluid loss. In surgical shock, the results of transfusion are often disappointing, owing possibly to increased capillary permeability, which permits fluids, salts, and even plasma proteins to leak out of the blood vessels into the tissues. Apparently the great need in cases of surgical shock is the restoration of circulating fluids. During the war resort was had to colloid solutions, such as gum acacia, which were introduced intravenously in large quantities; such solutions were apparently more effectively retained than simple sodium chloride solutions, and the procedure was considered life-saving in many instances. Several accidents have occurred from the use of gum acacia, but these could probably have been avoided by greater care in the selection of the acacia and the preparation of its solution.

In cases of dehydration, as after gas poisoning or excessive burns, the administration of sodium chloride solution intravenously may sometimes save life.

Combating the Effects of Toxæmia.—Sodium chloride solution is administered intravenously to combat various forms of toxæmia. The toxæmia accompanying high intestinal obstruction or stasis is usually evidenced by vomiting, dehydration and concentration of the blood. Clinically there are redness of the hands and face, a low blood pressure, oliguria, psychic and mental disturbance, and sometimes symptoms of tetany and urimia. A study of the chemistry of the blood in such cases reveals a high level of urea, a low level of blood chloride and alkalosis, with an increase in the carbon dioxide-carrying capacity of the plasma. In many cases, this condition leads quickly to fatal consequences. The intravenous administration of 1 liter of a 1-per cent. solution of

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sodium chloride two or three times a day usually results in a striking improvement of symptoms and a gradual return to normal proportions of the chemical constituents of the blood. In cases of pyloric obstruction, the risks of surgical operation may be diminished greatly by the pre-operative injection of sodium chloride solution. The use of this solution is also beneficial post-operatively, particularly in cases evidencing inhibition of motor function after operation on the stomach and duodenum. If the condition is of long standing and inanition is marked, the addition of glucose up to 5 or 10 per cent. is desirable. Locke's solution may be substituted, but sodium chloride appears to be the salt most crucially needed. If tetany is profound, injections of 5 c.c. of a 10-per cent. solution of calcium chloride may prove immediately helpful in the control of neuromuscular manifestations. Similarly, many patients with asthenic uremia who are definitely dehydrated frequently make immediate and sustained improvement following the intravenous administration of solutions of glucose. They are thus tided over a critical period.

During post-operative drainage of the gall-bladder or of the common duct, a form of toxæmia may sometimes occur which is accompanied by the decreased excretion of bile or by the excretion of a pale or colourless bile, and sometimes by extreme malaise, oliguria and dehydration. A chemical study of the blood usually reveals high blood urea and sometimes acidosis. Under these conditions, the administration of a 5 per cent. solution of sodium bicarbonate, a 1 per cent. solution of sodium chloride or a 5 to 10 per cent. solution of glucose either alone or in combination, in amounts of 1 liter, often leads to immediate clinical improvement and an increase in the output of bile pigments.

The intravenous injection of glucose solution has recently been gaining favour among obstetricians for the treatment of excessive vomiting of pregnancy and following venesection in the treatment of eclamptic convulsions. Its use is recommended only after milder measures have failed. From 500 to 1,000 c.c. of a 10 or even 20 per cent. solution may be given. When the stronger solution is employed some obstetricians advocate simultaneous administration of small doses of insulin.

The Supply of Glucose in Hypoglycæmia.—In severe cases of diabetes the occasional administration of overdoses of insulin may result in shock in which the patient may lose consciousness and become unable to swallow. Under such circumstances the hypoglycæmia may be combated expeditiously by the intravenous administration of 10 to 20 gm. of glucose (100 c.c. of 10 or 20 per cent. solution).

Combating Acidosis.—In diabetic coma, it is important to attack acidosis promptly, and also to provide fluids in large quantity. The subcutaneous administration of insulin will usually suffice for the control of the acidosis, but if the alkali reserve persists at a very low level it may be restored by the intravenous injection of 1 liter of a 5 per cent. solution of sodium bicarbonate. Some feel, however, that the use of alkali is both unnecessary and harmful. If the patient is vomiting and also expelling fluids by rectum, fluid should be given both subcutaneously and intravenously. Physiologic sodium chloride solution seems best for this. It is a good general rule, in these cases, to make the liquid intake equal 1 liter every six hours.

Anhydremic acidosis in infancy and childhood may usually be controlled by the oral administration of water and by the rectal injection of a glucose or sodium chloride solution. If this fails, water, sodium chloride and glucose may be used intravenously.

Acidosis is encountered in many other diseases. If marked, it usually requires treatment, and sodium bicarbonate is usually effective in controlling it.

Production of Dehydration.—In neurologic surgery, increased intra-cranial pressure is combated at times by the use of hypertonic solutions. If slow pulse, low blood pressure and stertorous breathing develop after operation, 1 ounce (30 c.c.) of magnesium sulphate (saturated solution) is given daily by mouth unless coma, vomiting or other features preclude this, in which case 2 ounces (60 c.c.) is given by rectum. If neither of these methods can be used successfully in controlling increased intracranial pressure, from 100 to 150 c.c. of a 15 per cent. hypertonic sodium chloride solution is given intravenously. Hypertonic glucose solution may be substituted if desired. Occasionally this procedure is indicated before operation.

III. INTRAVENOUS INSULIN THERAPY.

The ideal mode of administration of insulin in diabetes would be a method which would imitate, as far as possible, the physiologic liberation of this hormone from the pancreatic gland. It must be admitted that information regarding this point is still fragmentary. We know that the blood sugar during fasting in man and animals remains constant, a fact which indicates that carbohydrate metabolism is adjusted to a definite and constant rate. It is reasonable to assume that under these circumstances the liberation of insulin is also maintained at a constant rate. If the individual takes a meal the blood sugar begins to rise, but it returns to the previous level within a few hours. It has been shown that this alimentary hyperglycæmia can be suppressed by a suitable dose of insulin. It may be inferred, therefore, that the alimentary hyperglycæmia is due to a temporarily inadequate mobilization of insulin from the pancreas. Yet this alimentary hyperglycæmia is of short duration and is evidently not incompatible with perfect health. The situation is quite different in the diabetic organism. Here there is a persistent decrease in the rate of utilization of carbohydrate, as indicated by a persistent hyperglycæmia, regardless of whether food is being consumed or whether the individual is fasting. Insulin therapy should aim to restore the blood sugar fluctuations to normal. For many reasons, the solution of this problem is intimately related to the mode of administration of the drug; in fact, this question loomed up soon after the discovery of insulin. The Toronto school attacked the problem immediately in a comprehensive manner. It was soon found that the blood sugar, after the subcutaneous or intravenous injection of a non-fatal dose of insulin, reaches a minimum within from one to three hours, and this is followed by fairly rapid return of the blood sugar to normal. Unfortunately, it is impossible to prolong the duration of the insulin action by increasing the dose without serious risk to the patient, for it has been shown conclusively that a severe hypoglycæmia is accompanied by serious symptoms. As single daily doses in severe cases do not seem to suffice, it is necessary to resort to more frequent injections. It is quite obvious that such frequent injections by the intravenous route would tax beyond reason the patient as well as the physician and an intravenous injection is properly regarded as a minor surgical operation, requiring a good deal of skill.

Experience during the last few years has shown that the intravenous administration of insulin should be restricted solely to emergency cases, when the condition of the patient is so grave as to require the most immediate results. Even in severe cases of diabetic coma it is rarely necessary to resort to intravenous insulin therapy. If it seems essential to administer insulin intravenously, the usual precautions for this procedure should be observed; i.e., avoidance of infiltration of the perivascular tissues and a relatively slow rate of injection.

Apart from emergency cases, the use of insulin by intravenous injection is not justified. Even ignoring the great technical difficulties of very frequent intravenous injections, it is rather questionable whether this method is theoretically the best for the treatment of the ordinary case of diabetes. In fact, it was shown that in animals the pharmacologic potency of insulin injected intravenously is considerably smaller than that of the same dose given subcutaneously. It is quite possible that the lower effectiveness of intravenous injections is due to a greater rate of elimination of the drug by the kidney; but this has not been proved. Recent work has shown that insulin can be recovered from the urine of normal dogs in amounts varying with the rate at which it enters the blood stream. In the case of intravenous injection, the

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urine contains nearly the entire amount of insulin administered.

Although a great many attempts have been made to discover a more convenient mode of administration, the subcutaneous injection is still the most economical method that insures constancy of therapeutic action. Repeated subcutaneous injections are sometimes followed by local irritation of the tissues at the point of injection. The administration of insulin by mouth is accompanied by a destruction of the major part of the drug by the digestive enzymes. The addition of alcohol in this case does not materially increase the effectiveness. Rectal injections are inconvenient and produce great variations in therapeutic effect. The same applies to vaginal and intra-tracheal injections. Insulin is absorbed to a slight extent by the intact skin, but the results obtained by inunction are not satisfactory.

The Substitution of the Flocculation Test for the Wassermann Reaction.

By H. FERGUSON WATSON.

(*Edin. Med. Journ.*, May, 1927, p. 291.)

WATSON carried out a parallel series of tests on 1,211 sera (syphilitic and non-syphilitic) and found agreement between the Wassermann and flocculation methods in 96.86 per cent. The stock antigen for the flocculation method consists of an alcoholic extract of heart muscle saturated with cholesterol. For use in the test the stock antigen is diluted 1 in 6 by slow admixture with normal saline so as to form a turbid suspension.

The sera to be tested are heated at 55°C. for half an hour and are then diluted 1 in 2, 4, 8, 16, 32 and 64. 0.4 c.c. of each dilution is placed in a small test tube and to each tube is added 0.2 c.c. of antigen suspension. The tubes are placed in a rack, shaken for 5 minutes and incubated at 37°C. for four hours. Readings are taken at the end of this time, also after twelve to twenty-four and thirty-six hours.

Points to be attended to are:—(1) Heating of the sera prior to the test—55°C. for half an hour. (2) Shaking of test tubes for five minutes prior to incubation. (3) The age of the sera tested. It is important that the test be performed as soon as possible after withdrawing the blood. After being kept for four days or longer, sera originally positive tend to become negative. Where the maximum serological information is required, both the flocculation and the complement deviation methods should be employed. The simplicity of the technique, always however with the proviso that the above mentioned points are atteneded to, makes the test a valuable one, particularly in localities where facilities are not available for carrying out the more complicated Wassermann procedure.

A Non-Motile Strain of B. typhosus.

By R. G. ARCHIBALD.

(*Journ. Trop. Med. and Hyg.*, May, 1927, pp. 125–126.)

ARCHIBALD reports an interesting case of infection with a non-motile strain of *B. typhosus*. The organism was isolated from the blood and stools of a patient who, two months prior to his illness, had received two doses of T. A. B. vaccine. The organism gave the biochemical and serological reactions of *B. typhosus*, including agglutination with high-titre sera, but differed from the classical typhoid strains in being consistently non-motile. The clinical course of the illness was also atypical, as apart from pyrexia and weakness no marked signs or symptoms were present. Whether the *B. typhosus* group is or is not a homogeneous entity or whether the motility of this strain had been interfered with by previous inoculation is an interesting subject for speculation.

Loose Bodies in Joints.

By HARRY PLATT.

(*British Med. Journ.*, May, 1927, p. 947.)

HARRY PLATT points out that loose bodies in joints are divisible into three groups; (*a*) those occurring in diseased joints, (*b*) those occurring in joints otherwise healthy, (*c*) those which develop primarily as synovial chondromata. Those in group (*a*) originate from separation of small portions of changed articular surfaces as in osteo-arthritis, and Charcot's tabetic joint. The pathogenesis of bodies which form in joints otherwise apparently healthy (group *b*) is not so simple. In this variety, the loose body is frequently single and occurs most commonly in the knee-joint in young adult males. It is generally agreed that trauma plays a considerable part in the production of these bodies, but it is doubtful if this is the entire explanation. Those which are comprised under the term "synovial chondromata" (group *c*) are believed to develop from small nests of cartilage cells which are commonly found in normal synovial villi.

Consideration is next devoted to diagnosis and treatment, with special reference to the knee-joint, in which the condition is commonest. While clinical signs and symptoms may lead to a suspicion of loose body, the matter can only be settled finally by radiographic examination. Where the bodies are multiple it is essential accurately to count them and to localise their position on the radiogram; otherwise one or more may be left behind at subsequent operation. Once diagnosed, operative interference is the only possible mode of treatment. The bodies are extracted in turn from the various synovial pouches, which are entered by means of capsular incisions of small extent. With such technique, there is minimum interference with the knee-joint and rapid return of function is favoured. Arthrotomy is reserved only for bad cases.

Toxic Effects of the Arsenobenzol Compounds.

By MAJOR P. POWER.

(*Journ. Royal Army Med. Corps*, January, 1927, p. 46.).

MAJOR POWER classifies toxic symptoms into immediate reactions occurring within twenty-four hours and late reactions.

I. *Immediate Reactions.*

(*a*) Headache, rigors, pyrexia, vomiting, diarrhœa or transient skin eruptions. With the exception of the last named these symptoms are usually mild, respond to ordinary lines of treatment for such conditions, and call for no further comment. The transient rashes are also mild at the time, but further treatment with the arsenobenzol group without an appropriate interval may quickly produce that grave general and skin condition, "exfoliative dermatitis."

(*b*) Vasomotor reactions, or the so-called "anaphylactoid shock."

(1) Pulmonary symptoms: dyspnœa, flushing of the face and neck, sweating, dilated pupils, a full bounding pulse, a feeling of tightness about the chest, and occasionally swelling of the tongue and lips.

(2) Cardiac symptoms, from pallor or dizziness to syncope and shock with a failing pulse. These vasomotor reactions are usually mild, although often alarming at the time, the cardiac reactions being more dangerous than the pulmonary.

Treatment.—Pulmonary effects are best treated by placing the patient in a sitting-up posture and giving a hypodermic injection either of atropine 1|50 grain, or adrenalin hydrochloride, one cubic centimetre of 1|1000 solution; the latter may be repeated four-hourly, but this is seldom necessary.

These reactions can be almost entirely prevented by the above line of treatment given five to ten minutes prior to the patient receiving his injections of the arsenical preparations.

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Cardiac effects are best treated by placing the patient in the recumbent posture with head low and giving a hypodermic injection of strychnine 1/32 grain, or ether, thirty minims, or camphor 1½ grains dissolved in oil.

Artificial respiration may have to be resorted to in grave cases.

Desensitization of the patient by administering a minute dose of the arsenical preparation half an hour before giving the larger therapeutic dose is said to prevent these vasomotor disturbances.

II. *Late Reactions.*

(*a*) *Stomatitis, Albuminuria, Anæmia.* Of these, stomatitis is the most common. It is usually mild, often accompanied by gradual loss of weight, anæmia, and, in some cases, albuminuria. Stomatitis cases should be watched carefully as they are prone to suffer from skin reactions, should the arsenical preparations be continued without a break.

The prevention of stomatitis consists in strict hygiene of the mouth from the very commencement of treatment.

(*b*) *Symptoms involving the Central Nervous System.* The most important condition under this heading is the so-called "encephalitis hæmorrhagica" or "serous apoplexy." Serous apoplexy is a grave condition usually occurring between the second and third day after treatment by the arsenobenzol group. It is most commonly seen after the second injection of the drug in use.

In this condition the patient complains of severe headache, he is irritable, the temperature is raised, the appetite disappears, and vomiting usually occurs. He curls himself up in bed and resents being touched. He rapidly becomes worse, lapsing into a comatose condition with retention of urine and unequal pupils, later, urine and fæces may be passed involuntarily in the bed. Deep reflexes at first are greatly increased, but later tend to disappear. The patient has one or more epileptiform convulsions and may die.

Treatment must be prompt and energetic.

(1) Inject adrenalin hydrochloride, one cubic centimetre (1 in 1,000) subcutaneously, and repeat four-hourly for the first twenty-four to forty-eight hours.

(2) Perform venepuncture, withdrawing one pint of blood.

(3) Perform lumbar puncture, taking off sixteen to twenty cubic centimetres of cerebro-spinal fluid. Should convulsions recur later, lumbar puncture should be repeated.

(4) Give a purgative. In the majority of cases, if the above line of treatment is carried out early the patient will recover.

(*c*) *Liver Complications.*

(1) "Early jaundice," benign, mild, and evanescent in most cases, coming on within a fortnight after injection with one of the arsenobenzol compounds. It is sometimes preceded by a scarlatiniform or urticarial rash.

(2) "Late jaundice," the so-called "spatikterus" of the Germans, occurring weeks or months after all anti-syphilitic treatment has ceased, is usually mild in character, but may be severe.

(3) "Acute yellow atrophy of liver." This usually begins like the other two forms of jaundice mentioned, but progresses rapidly into a most grave condition, frequently ending in death.

Prevention.—These liver complications can be prevented by administering glucose, twelve drachms, sodium bicarbonate, twenty grains, by the mouth half an hour prior to injection with "606" or "914," etc.

This procedure causes a filling up of the liver cells with glycogen; these cells have then a lessened affinity for the arsenic contained in the arsenobenzol group.

For the same reason it is inadvisable to starve patients prior to their injections, as the liver cells then tend rapidly to take up arsenic when it is injected.

Treatment.—Stop all arsenical and mercurial or bismuth preparations. Make the patient lie up in bed. Keep him on a carbohydrate diet with very little protein and no fat. Give mild laxatives such as rhubarb, which may be combined with sodium bicarbonate. Sodium salicylate also appears to do good. Give large doses of glucose by the mouth, also intravenously twenty cubic centimetres of a twenty per cent. solution, repeated after a couple of days' interval. Glucose is specific in the prevention and treatment of these jaundice cases.

Give sodium thiosulphate intravenously. Large doses are better than small, 0.6 gramme, gradually increased to 0.9, dissolved in ten to twelve cubic centimetres of distilled water, autoclaved, strained and cooled; repeated every other day up to eight or nine injections if necessary.

(*d*) *Skin Reactions.*—Toxic jaundice and dermatitis appear to have become more common in recent years, but both are now being prevented to a large extent by the administration of glucose by the mouth prior to injection.

These undesirable skin reactions vary in their intensity, and when mild they tend to be overlooked and injections may be continued, with the result that the patient rapidly develops that severe and dangerous condition known as "exfoliative dermatitis."

These rashes generally commence as a patch of erythema appearing at the site of injection, although it may appear anywhere and be rapidly followed by others which tend to coalesce. The first rash may be scarlatiniform in character, or urticarial or morbilliform. If these early rashes are overlooked, and more treatment with the arsenobenzol group is given, a general dermatitis rapidly follows which becomes vesicular, even pustular in places, and resembles a weeping eczema, with desquamation following; in fact, a typical "exfoliative dermatitis."

Treatment.—Stop all anti-syphilitic treatment. Put the patient to bed in a bright airy room. Prevent chills and keep the patient out of draughts. Nurse the case as if it were enteric fever and only allow fluids such as milk, barley water, egg flips, etc. Keep the weight of the bedclothes off the patient by means of a cradle.

Give glucose as already recommended for liver complications; also push sodium thiosulphate or thiosinamin, as already mentioned under liver complications. Give sulphur, twenty grains, by the mouth morning and evening. Apply calamine lotion locally to the affected areas; if properly applied and allowed to dry on the skin it is better than ichthyol ointment. Later, when desquamation is taking place, bran baths are very beneficial.

Major Power gives a few golden rules for the administration of the arsenobenzol compounds:—

Give the patient a purgative the night before.

Carefully examine the patient prior to injection.

Do not starve the patient prior to injection.

Administer glucose by the mouth prior to injection.

Test all ampoules of the drug carefully.

By preference give the "914" group intramuscularly.

Use water freshly distilled and autoclaved on the morning of the injection.

Give the "914" group at room temperature and not warm.

Have a needle which closely and accurately fits the syringe.

Do not inject air bubbles into a vein.

Do not allow even a trace of alcohol in the needle or syringe after sterilization between injections.

Strain the solution prior to injection.

Inject into a vein very slowly.

After injection allow a trace of blood to run back into the syringe.

Never inject a cloudy solution; it should have a clear golden colour.

Inject the drug as soon as possible after opening the ampoule; it becomes toxic if allowed to stand too long.

After injection only allow light work for twenty-four hours and no alcohol for thirty-six hours.

Strict aseptic methods must be enforced.

On an adjoining table place a hypodermic syringe ready and have adrenalin and strychnine to hand for use in case of need.

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Medical Evidence.

(*Lancet*, December 18th, 1926, p. 1302.)

AT the annual dinner of the Medico-Legal Society Mr. Justice Greer mentioned how closely the respective sets of problems of the two professions resembled one another. Doctors had often to diagnose on subjective symptoms, without being able to see inside the patient, and judges had to decide cases on evidence that might be imperfect or even dishonest. Two of the most important subjects of common interest to both to-day were those of the effects of nervous shock and of insanity. So far from medical witnesses being reluctant to give a plain "Yes" or "No" they were often positive when they should say, "Neither I nor anybody else can tell." The question of nervous shock and its effect was a typical one in which positive assertion was to be avoided. He was always inclined to give the subject the benefit of the doubt. Doctor and lawyer were alike handicapped by not being able to see the sufferer as he would be five years afterwards. In their attitude to mental disease doctors and lawyers had taken up very different positions, but there was not so much difference between them as might at first sight appear. The issue to be decided by trial was not whether a man was suffering from mental disease, but whether that disease was of such a character that he could not be held responsible for his acts, or, under the McNaghten ruling, that he either did not know the nature and quality of his acts or, if he did, that he did not know he could be punished for them. The law had to be laid down with great strictness, and modified where necessary by those whose duty it was to advise His Majesty when to exercise the Royal prerogative. Juries were somewhat inclined to sympathy with the medical view and the "unwritten law," and he saw no case for relaxing the law as at present laid down. Lord Justice Atkin remarked that the distinction between insanity and "legal insanity" was one drawn by very few people in fact, but that there must be a degree of insanity fixed by law as a boundary between criminal responsibility and irresponsibility. It was important to abstain from language that might emphasise the difference in the views held by each profession. Not long ago a high judicial authority had denounced as fantastic the view that a person who committed a crime under an irresistible impulse produced by disease should be held irresponsible. On the contrary, that doctrine was unanswerable. The committee over which he presided had accepted it, and lawyers such as Sir Archibald Bodkin, the late Sir Richard Muir, Sir Herbert Stephen, and Sir Ernley Blackwell were not likely to hold "fantastic" views.

Medical Education in China.

(*British Med. Journ.*, December 25th, 1926, p. 1236.)

AN attempt to depict the present state of medical education in China has been made in the August, 1926 issue of the *China Medical Journal*. Of the thirteen medical schools enlisting in 1909, seven have disappeared, and there seems to be some diminution in the supply of medical graduates trained on the lines of Western science. Nine medical schools are described in the *China Medical Journal* as having educated 650 students, and it is estimated that including the output of other schools in China, and also those Chinese who have graduated in Europe, America, and Japan, there are only about 1,500 to 2,000 practitioners of modern scientific medicine for a population of 450,000,000. About 500 medical students are at present receiving instruction in the nine schools, which are situated in Peking, Mukden, Changsha, Shanghai (two), Shantung, Chengtu, Hangchow, and Canton. Including students in other schools of lower grade, or attached to foreign medical schools, the number under instruction amounts to 1,000, of whom fewer than 200 graduate each year. Since there are about 600 mission and Chinese hospitals organized on Western lines the shortage of trained medical practitioners is obvious, and the difficulty can scarcely be dismissed as light-heartedly, as by one of the leaders in the recent disturbances, who remarked: "We do not want your hospitals; there are so many people in China that the death of a lot doesn't matter."

The Use of Alcohol in Medicine.

By DR. C. WILLCOX.

(*International Med. Digest*, December, 1926, p. 329.)

CHARLES WILLCOX in the *Virginia Medical Monthly* of September 1926, deals with this subject in a very temperate manner. He calls attention to the great danger of forming habit, and so is opposed to ordering it to young adults except in alarming conditions. Alcohol is rapidly absorbed from the stomach and is the only food which is absorbed unchanged from the intestinal tract. About 98 per cent. is utilised in the body when it is given in ordinary doses.

It causes an increase in gastric secretion but on the other hand it inhibits the gastric ferments to some extent. Good brandy relieves flatulence and a little alcohol with meals is of considerable value in the case of feeble elderly patients with weak digestions. It is of great value in the collapse following summer diarrhœas in infants, also in pneumonia in infants. The author has had good results in Asiatic cholera. In pneumonia in adults it is useful in cases with delirium and failing heart, and in alcoholic patients it is essential. It is very useful in typhoid fever and usually in septic cases. In diabetes it is of value as it forms a source of substitute for part of the carbohydrate intake and so lessens the need for insulin. The nausea of seasickness is often relieved by alcohol. Its great virtue lies in the sense of repose and well being which helps to tide a patient over crisis. It should be used fearlessly and with the same judgment as is employed in the use of other drugs.

Treatment by Drugs.

A Dip in a General Practitioner's Tool-Kit.

By H. GUY-DAIN, M.B. (Lond.).

(*British Med. Journ.*, December 25th, 1926, p. 1219.)

SOME of the prescriptions given in this address may be found useful.

The morphine-relieved patient becomes so miserable and mentally altered, and requires so constantly increased a dose that Dr. Guy-Dain always experiments with combinations of other pain-relievers for as long as possible, in the best interests of both the patient and his friends.

Of the many and varied conditions with which the general practitioner has to deal, it will be agreed that the catarrhs, acute and chronic, of all the various mucous membranes easily outnumber every other complaint, and perhaps there are no other illnesses in which the patient is more grateful for relief. The catarrhs of the respiratory passages are, specially and peculiarly, prevalent and persistent. Take the common acute "cold in the nose" with its violent sneezing and profuse dripping—most uncomfortable and very depressing. We all know that it will pass through its various stages and disappear in due course, but the effect upon many people in the pouring stage, of a few doses of ammonium chloride 10 grains, sodium salicylate 10 grains, chlorodyne 10 minims, is almost magical, but if the formula is taken to pieces and each constituent tried separately the same effect cannot be obtained. And when a catarrh has become bronchial and tends to stick, creosote in combination with potassium iodide will often benefit cases of chronic bronchitis enormously. He has tried these two drugs in the treatment of acute pneumonia, but without any satisfying results. In the management and treatment of acute pneumonia it is dangerous or even fatal to give saline aperients, especially magnesium sulphate; and expectorants are almost equally undesirable, as they promote the flow of mucus and increase

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the risk of the condition which all must have seen where the patient literally drowns in his own bronchial secretion. Hence he advises in the early stages, quinine and calcium chloride, to keep the air passages dry, with the addition of opium when there is much pleuritic pain. It is fairly common knowlege that paraldehyde is often most effective with the sleepless pneumonia patient, and especially useful when nearing the crisis.

In dealing with influenza, earlier relief of symptoms is secured by the administration of quinine and aspirin (and here again neither is as effective by itself) than from any other remedies. The many varied uses of aspirin in pains and febrile conditions must be well known.

We are told that the intestinal antiseptics, so called, do not act as antiseptics to any appreciable extent, but of the usefulness of many of them in the treatment of intestinal conditions Dr. Guy-Dain is perfectly satisfied. Salol in conditions of catarrh or diarrhœa, alike in small children and older people, has come to be one of his sheet-anchors. In cases of gastric catarrh with furred tongue the addition of half a minim of liquid carbolic acid to the ordinary dose of rhubarb and soda mixture often greatly increases its effectiveness. And again, where this is not effective two or three minims of tincture of iodine will often be helpful. In the treatment of mucous colitis, besides the use of salol, many will be aware of a formula advocated with great enthusiasm by Dr. Stacey Wilson: liquid perchloride of iron, liquid perchloride of mercury, and tincture of hyoscyamus, of each 15 minims, given half an hour before food. Not all patients respond either to this or to salol, and then great benefit results in some very severe and prolonged cases from iron and ammonium citrate 5 grains, liquor hamamelidis 15 minims, tincture of opium 2 minims, the opium being omitted where pain and diarrhœa are not present. Here again he has taken the formula to pieces and used the bits without getting the results. As a matter of fact he is particularly pleased with the use of this prescription, for it has enabled several chronic and miserable invalids to go to work regularly, and if they occasionally relapse, "the bottle" (as the Scots patient has it) sets them on their feet again.

In these days, when it is so usual, or so fashionable, to suffer from "nerves," it often becomes a problem to know how to help nervy, jumpy, badly sleeping individuals. Bromide is capable of quieting them and helping them to sleep, but is liable to depress them further and may make them dependent on its continued administration. Experience has shown that potassium bromide 10 grains with liquor strychninæ 3 minims is most helpful to this type of patient. Bromide by itself depresses them; strychnine by itself is deadly for them—they become more jumpy and strung up at once. But the two given together produce calmness without depression, and help them to get back their sleep.

Another use of bromide is in the vomiting of pregnancy. Again, all will be familiar with the indigestion of the tired and harassed business man which is immediately relieved by a dose of 10 grains of potassium bromide half an hour before a meal. In the treatment of failing heart muscle the administration of adrenaline is recommended, and we are told that it is only effective when given hypodermically; but some good result is obtained when given by the mouth.

The Radiological Review.

A JOURNAL which, in its fourth year of publication, has been entirely reorganised is *The Radiological Review*, published by the Radiological Review Publishing Co., Quincy, Illinois, U. S. A. This differs from other journals devoted to radiology and electrotherapeutics in that it is intended to help and inform the general practitioner with reference to his radiological problems. In the number which we have received Dr. F. W. H. Taylor of Los Angeles deals with the relationship of radiology to dermatology, Dr. W. M. Sheridan on *x*-rays in the treatment of pertussis; Dr. E. S. Blaine on myelomatas; and Dr. A. U. Desjardines of the Mayo Clinic with the scope of radiology in general. A specially interesting and well illustrated article is that by Dr. Q. U. Newell on the use of iodipin as a diagnostic in gynæcology, illustrated by very good skiagrams of normal and abnormal conditions; whilst editorial notes deal with cholecystography in diabetes mellitus, and the control of cancer. The number includes a series of abstracts and reviews of subjects of radiological interest, written by different specialists in their own branches more as general reviews of progress than as reviews of special papers. Amongst these, the articles by W. E. Dandy on the radiology of brain tumours, and the review of a paper by H. Schmitz and J. E. F. Laibe on inoperable carcinoma of the urinary bladder are especially interesting. Book reviews are also included, whilst a special feature is an alphabetical index to the subjects dealt with in the number. The annual subscription is $2—equivalent to Rs. 6—and the journal would appear to fulfil a long-felt want in supplying the general practitioner with information on a subject with regard to which he is often only too unfamiliar.

Reviews.

PSYCHOTHERAPY; MENTAL ELEMENTS IN THE TREATMENT OF DISEASE.—By E. W. Taylor, Professor of Neurology, Harvard University. Bombay & London: Oxford University Press, 1926. Pp. 53. Price, 4s. 6d.

WE wish that every one of our readers would read and study this small and deeply interesting book, for it puts the present position of psychotherapy in a nutshell. It is one of the Harvard University Health Talks, and is the substance of a lecture delivered by the author at the Harvard Club in 1924.

Essentially the author deals with his subject in historical sequence, and there could be no method better calculated to bring out the contrast between the present rational position of psychotherapy and its dim and mystical origins in the past. Just as modern therapeutics have grown out of past empiricism and charlatanism—owing to the rise of modern pharmacology as a science, and of biochemistry—so the days of the witches and miracle-workers have to-day given place to the modern psycho-analyst, whatever school he may belong to.

The influence of mind over matter and over diseases exists, and it is of importance for the medical profession to recognise this truth and not burke it. Further, if this tremendously interesting field of research is to drop out of the hands of the professional and rational enquirer, claims the author, the position will spell disaster. "For the present purpose" he writes, "it is only necessary to say that the whole chaotic period preceding the eighteenth century represents a somewhat childlike way of looking at the whole subject. It did nothing to forward the course of exact thinking, and in fact served rather to prejudice the maturing scientific mind of the last two or three centuries against the whole subject." And traces—even more than traces—of that intolerance still linger to the present day.

The first person to arouse general interest in the problem was Mesmer (1733–1815). True, he adopted the atmosphere of a charlatan; largely he worked for his own personal gain, but he did at least forcibly demonstrate one thing; the emotional force which external agencies can exercise upon the mental and even physical state of the patient, and the complete subservience of the patient's reasoning faculty. "What we do know and what is important is the fact that attention had finally been fixed upon a series of phenomena, which demanded explanation, and which, if understood more completely, might well have a distinct bearing on human welfare."

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The second of the great pioneers was James Braid, an English surgeon of Manchester (1795—1860), who showed that Mesmer's supposed magnetic fluid was non-existent, that the whole of the phenomena took place in the mental realm, and who used hypnotism in his practice. The clinical period of psychotherapy may be said to have begun with Charcot about 1878, at the Salpetrière in Paris. That a man of such distinguished eminence in the medical world should have taken up hypnotism seriously, and should have been willing to recognise the phenomena concerned as worthy of scientific investigation, was a notable event. He was associated with Charles Richet in 1875, and followed by Pierre Janet, whose study of disordered mental function on the basis of painstaking investigation of individual patients will long stand as a model of close observation and clinical method.

From the early clinical period, the transition to the present-day psycho-analytical period is especially associated with the names of Freud, Jung and their followers. "In general," writes Dr. Taylor, "it may be said that the predominant importance given to the sex instinct in the genesis of neuropathic states has been the exciting cause of the often uncritical condemnation of the psycho-analytical approach..... It may doubtless be demonstrated that psychotherapy based upon a sexual foundation may fail in practice, but this cannot destroy the usefulness of the generalization in its broader aspects, nor can it be denied that with all its vagaries and over-accentuation at the hands of certain of its more enthusiastic and uncritical adherents, a distinct step in progress has been made by the analytical school."

Thus we come to present-day analytical therapy; the subject of experiment and a field wherein two different schools of thought are manifest. But it is a far cry from the mystical practices of the Middle Ages to the psycho-analytical laboratories of to-day. "In general the struggle between what we should like to do and what we ought to do constitutes the field in which the neurotic disturbances grow, and, broadly speaking, it is in this field that the most recent psycho-therapeutic attempt is striving to introduce some semblance of order, through the formulation of laws of mental activity..... This development is certainly significant and must soon, at least in its outlines, be made the common property of students and practitioners of medicine, as are the ascertained facts of the physical body. But—and herein lies a special danger—the science must be kept in the hands of the medical profession; any other course will spell unlimited quackery."

We have tried to give some idea of Dr. Taylor's very readable and exceedingly interesting brochure. It is one which we hope will have a wide circulation, for it gives an admirable synopsis of the subject, and will be of interest, not only to the medical man, but also to the layman.

R. K.

EXAMINATION OF CHILDREN BY CLINICAL AND LABORATORY METHODS.—By Abraham Levinson, B.S., M.D. Second Edition. St. Louis: The C. V. Mosby Company. Pp. 192 with 85 Illustrations. Price, $3.50.

IN this small volume Dr. Levinson gives an admirably clear and lucid outline of the practical applications of the science of pediatrics. The first half dozen chapters deal with the personal and family histories and the ordinary clinical methods of examination. Chapters VII to XI inclusive are devoted to a very complete exposition of the examination of the blood, cerebrospinal fluid, urine and stools. The remainder of the book comprises descriptions of several miscellaneous but highly important procedures such as rœntgenography, gastric lavage, thoracocentesis, tracheotomy, etc.

One can find very little to criticise in this valuable book: we think however, that a minimum of 300 cells is essential for a differential white blood cell count to have any value.

In estimations of blood sugar one notices that American workers apparently prefer the colorimetric method of Folin and Wu to the more recent, and in the opinion of English physicians more reliable, technique of Maclean. The same feature is noticeable in the discussion on renal function tests, where the phenol-sulphonaphthalein method is apparently practised to the exclusion of the urea concentration test so commonly employed in Europe.

A few errors have crept in, but these are almost entirely due to flaws in printing and will doubtless be corrected in future editions. On p. 74 'Arnett index' should read 'Arneth index' and on p. 75 the colour index in secondary anæmia is given as '0.01 or below' instead of '1 or below.'

We do not agree with the formula for acid alcohol as given on p. 138, and on p. 157, 'calories' should read 'colonies': but these are all minor faults and do not detract from the general excellence of the work.

We would heartily recommend Dr. Levinson's book not only to the pediatrician, but to the general practitioner among whose patients there is necessarily a considerable percentage of children: both will find it of very great value.

J. M. H.

SHELL SHOCK AND ITS AFTERMATH.—By Norman Fenton, Ph.D. St. Louis: The C. V. Mosby Company. Illustrated. Pp. 173. Price, $3.00.

IN this book Dr. Fenton has described his experiences of the war neuroses in France with the Base Hospital 117 A. E. F. and the results found by following up these cases for several years after.

In the hospital all these cases were collected and treated by experts; later in America they were cared for under the auspices of the National Committee for Mental Hygiene.

The A. E. F. organisation for dealing with the war neuroses was probably the best organized and most carefully recruited of all those in the armies of the war.

The description of this organization is the most interesting part of the book. The later chapters which deal with the after results and final conditions of these cases make rather difficult reading.

There are innumerable statistics of all kinds, showing the incidence of and the results finally obtained in all types of cases in the different classes of patients.

This book is the only one of its kind and should therefore prove useful to all interested in the subject.

H. H.

EPIDEMIC DISEASES OF THE CENTRAL NERVOUS SYSTEM.—By A. S. MacNalty, M.A., M.D. (Oxon.). London: Faber and Gwyer, 1927. Pp. xiii plus 194. Price, 12s. 6d. net.

DR. MACNALTY delivered the Milroy Lectures in 1925 and this book contains an expanded form of these lectures.

The three diseases dealt with are cerebro-spinal fever, acute poliomyelitis, and encephalitis lethargica.

There can be no doubt that these diseases are of great and increasing importance to the community, and also that the methods by which they are spread are not known with certainty.

The author points out how these diseases have greatly increased during recent years, and draws attention to the possibility of epidemics of them in the future.

The steps by which the epidemic nature of these diseases has been gradually recognized are clearly described, and the history of each is given.

In discussing the epidemicity of each, the author of necessity has to describe numerous epidemics, both large and small in detail. This makes rather wearisome reading but is essential for the completeness of the argument.

The conclusions formed are that each of these diseases is a separate entity, although acute poliomyelitis and encephalitis may be related to each other as typhoid and the paratyphoids are.

There is very strong evidence that in these diseases the infection always enters by the nose, but the previous steps by which infection is spread are by no means so certain.

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First Aid

IN

Food Poisoning Cases

IN summer and autumn, when much over-kept fruit and meat are sold, food poisoning cases are often the *bête noir* of busy practitioners.

The urgency and violence of the symptoms produced require the immediate personal attention of the physician, and a prolonged supervision over many hours which can often be ill-spared.

A reliable and potent intestinal bactericide, administered at the first onset of the symptoms, might avert a fatal result by destroying the infective organisms and thus controlling the further supply of toxins.

But, as the stomach and intestine are irritable, although depleted of solid matter after a bout of food poisoning, it is of the first importance that the intestinal disinfectant used should be *non-toxic* to avoid further depression of the sufferer by absorption of the remedy into the circulation.

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"As in the majority of bacterial food poisoning cases, the danger to life arises from the formation of a toxin, it is open to conviction that an efficient intestinal bactericide, administered at the first onset of the symptoms, might destroy the infective organisms and avert a fatal result by controlling the further supply of toxin. The possibility of this should be considered, more especially since the problem of intestinal disinfection has at last been solved by the introduction of the new benzene derivative dimol."—THE MEDICAL PRESS AND CIRCULAR, *September 20th*, 1922.

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The importance of the carrier is obvious, and there are many reasons for considering the immune carrier as of prime importance.

There is a full bibliography, and this is the first book that one has met with that entirely deals with the subject. It can therefore be strongly recommended to all who are interested in this subject and should be invaluable to practical workers in public health.

H. H.

SYMBIONTICISM AND THE ORIGIN OF SPECIES.—By Ivan E. Wallin, Sc. D. London: Baillière, Tindall and Cox, 1927. Pp. 171, with 4 Half-tone Plates. Price, 13s. 6d. net.

THIS is a most unorthodox book, but not the less interesting for that. The author, who is Professor of Anatomy in the University of Colorado, has been working for the past seven years on mitochondria, and this book is the outcome of that study. The mitochondria are minute bodies of varying staining reactions in the cytoplasm of cells of many tissues, especially in embryonic tissues and in insect tissues. The commonly accepted view of them is that they are cell-inclusions and lifeless; this view the author controverts; he considers that they are bacteria, and moreover bacteria which are necessary to the life of the cell, and of importance in the origin of new species.

The medical man is apt to regard bacteria as harmful, as he is accustomed only to the study of the pathogenic species: that there is an enormous range of useful bacteria, which build up foodstuffs for plants and carry out other useful duties, is hardly sufficiently recognised. After a review of the history of research work on mitochondria, the author passes on to his first important claim, that mitochondria are bacteria. Liver tissue from fœtal and new-born rabbits was planted in special media, with an adjusted pH reaction, and in these "clouded growths" were obtained. In tryptophane and urea media a surface growth occurred. External contamination was ruled out by the most elaborate precautions, and these organisms apparently came from the cells in the tissue itself. But the mitochondria showed a complete change in morphology in culture, and under different conditions, and their great pleomorphism is well shown. "These facts," concludes the author, "admit of no other interpretation than that mitochondria are living organisms, symbiotically combined with the cells of plants and animals." Further, he postulates that, as mitochondria are more numerous in young and growing tissue cells than in senile cells, they may be the controlling influence in cell division.

To this biological phenomenon of bacteria living within cells and forming an essential part of the cell-complex, the author gives the term "symbionticism," and a chapter is devoted to giving examples of microsymbiosis. In this the author assumes—apparently without question—that the Rickettsia bodies, which are the causes of such diseases as typhus fever and Rocky Mountain spotted fever, are mitochondria. (We fear that the majority of workers will fail to agree with this assumption. Wolbach, Cowdry, and other authorities on the Rickettsia group differentiate them sharply from mitochondria). But there are many and very interesting accounts of microsymbiosis given in the chapter. The account of the luminiferous organs of certain cephalopods, in which the luminosity is due to luminiferous bacteria, is a very interesting one.

An analysis of symbiont reactions follows, showing how there may be morphological responses in the host to the presence of microsymbionts, and from this the author is led to his main thesis, which is that it is the presence of mitochondria in the cells of plants and animals which leads to their morphological variations, and so to the origin of new species. A whole wealth of experimental and observational evidence goes to show that the living unit which transmits the hereditary characters of the cell is smaller than a chromosome; it is often referred to as a "gene." Genes are molecular entities, of the same nature in all forms of life, but varying in their arrangement and grouping in the chromosomes of different species. But the theory of genes implies that one must regard life as having originated as a "tremendously complex molecule, capable of splitting up into a vast number of simpler molecules." The amœba and man must have the same number of genes. From this view the author dissents. He considers that life must have originated from simple origins, and that it has been by the addition of mitochondria—i.e., helpful bacteria—from without that modifications have arisen. Bacteria are among the oldest forms of life, and unicellular organisms may have originated from bacteria.

The book is one which will appeal only to a selected circle of readers, but it will be welcomed by them. For the author is no wild speculator; his work is very careful, and his writing restrained. Realising that he has a completely unorthodox case to put forward, his very restraint in putting it forward lends more weight to his views. We agree with him that the only test for such novel hypotheses is the test of time; for time alone will show what is true and what is not. The weak point in his work appears to us to be his claim that mitochondria are bacteria, and that they are identical with the Rickettsia group of organisms. But such careful and elaborate investigations cannot result otherwise than in the increase of our knowledge in a very difficult field.

It remains to be added that the volume includes a most useful bibliography, and to congratulate the publishers on the admirable get up of the book and on its half-tone plates.

R. K.

PERNICIOUS ANÆMIA.—By Frank A. Evans, M.D. London: Baillière, Tindall & Cox, 1926. Pp. 177. Price, 11s. 6d. net.

DR. EVANS gives an excellent summary of what is known about pernicious anæmia.

Despite the number of books which have been written on this disease, the fact remains that it is one of the incurable maladies. Life can be greatly prolonged in some cases, but Dr. Evans states that no case of true pernicious anæmia has ever been cured.

Many patients who have shown the blood changes usually found in the disease have gone on to recovery, but these have been ruled out because they have not been fatal. This book will be found very useful to those who wish to know the most recent developments in the diagnosis and treatment of pernicious anæmia.

MODERN METHODS IN THE DIAGNOSIS AND TREATMENT OF HEART DISEASE.—By Francis Heatherley, M.B., B.S. (Lond.), F.R.C.S. Second Edition. London: Baillière, Tindall and Cox. Pp. xii plus 270. Price, 8s. 6d. net.

THIS is a short and clear sketch of the present state of our knowledge regarding heart disease and will be useful to the general practitioner who is too busy to go through all the recent and often conflicting literature on the subject. This new knowledge of the subject we owe to Sir James Mackenzie and his followers. The author of this book belongs to the old school and has brought out clearly the difference in conception of ideas in the new and old schools. In this second edition he has added a chapter on infections and one on blood pressure.

ADHUNIK CHIKITSA,—A BENGALI MONTHLY JOURNAL.—Edited by S. Singha, M.B., and K. L. De, M.B., D.T.M. Published by Adhunic Chikitsa Office, No. 22, Sukea Street, Calcutta. Yearly Subscription, Rs. 3-8. Each Copy, 5 As.

THIS paper deals with the modern knowledge of the diseases prevalent in this country. It is written in simple Bengali and will be useful for village practioners, as well as for the public.

THE ABDOMEN IN LABOUR.—By Norman Porritt, M.R.C.S., L.R.C.P. (Lond.). Bombay: The Oxford University Press and Constable & Co., 1926. Pp. xiv plus 96. Price, 5s.

THIS little volume that a busy general practitioner has put together fills one with joy, for like the parson's

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egg it is just full of good staff and one cannot but admire the enthusiasm and earnest desire to help others that obviously has inspired Dr. Porritt in the midnight watches over his patients. Writing as a clinician, one can say that there is not one single observation of his that one cannot corroborate. The author is firmly convinced of the advantages of the dorsal position for delivery and his observations on many practical points are of interest. We are surprised that he does not give more attention to posterior presentations which are the bugbear of the general practitioner, and the cause of so many still births, for it would be of great value to know how so experienced a midwife deals with those causes of delayed labour associated with early rupture of the membranes and the occiput posterior with a cervix which for days perhaps remains the size of a rupee. True it is that a soft answer turneth away wrath, but one wonders whether an expectant mother or father would be content with a sketch of the labouring abdomen which produceth not. Perhaps in a future edition the author will specify, rather than generalise for the sake of his lesser brethren.

SISHU SAMBARDHANAM, OR THE CARE AND NURSING OF CHILDREN. (WRITTEN IN THE GUJRATHI LANGUAGE.)—By Dr. Bhaskar Row Tembe. Yeotmal: Vaidarbha Pustakalaya, 1926. Pp. 124. Price, Re. 1.

THIS small book is written in simple Gujrathi vernacular language and is meant for the Mahratta people. The first few chapters deal with the most important points in connection with anatomy and physiology of the body of a child. The last few chapters are devoted to the diseases of childhood and the ways of preventing them. Considering the very large number of deaths in early childhood in India, people from other provinces should bring out booklets like this in their popular languages to educate the mass in each province. The holding of an annual Baby-week throughout India is certainly a step towards this.

A TEXTBOOK OF MIDWIFERY FOR STUDENTS AND PRACTITIONERS.—By R. W. Johnstone, C.B.E., M.A., M.D., F.R.C.S.E., M.R.C.P.E. Fifth Edition. London: A. C. Black, Ltd., 1926. Pp. xviii plus 508. Illustrations, 258. Price, 15s. net.

THE rapidity with which edition after edition of this book follows its predecessor goes to prove that it meets with the approval of Scots graduates. It is a most excellent compendium, and very little is left out. It can be safely recommended to the student of any University, provided the clinical teaching therein is good. In obstetrics it is the sense of touch and understanding that has to be cultivated, for an ounce of these is worth a ton of condensed and memorised facts, therefore this is a manual more fitted to the student in his 6th year than in his 4th. Beyond the condensation of closely printed facts there are no faults that one can possibly find in this book, but one is inclined to think that the average student wants a subject to be written not like a guide book but as a pleasing interlude, for there is no question that even a textbook can be so written. One is surprised that the author does not give credit to one of the greatest and most revered teachers that Edinburgh has ever produced, namely Ballantyne—the father and mother of modern ante-natal care in its finest sense; surely it is of such that Ecclesiasticus wrote "or shall one say that a prophet hath no honour in his own country." Again we cannot conceive that Professor Johnstone is seriously teaching the Walcher position. High forceps is as dead as the dodo; why therefore mention and illustrate an extinct procedure? We should have liked to have seen some reference to the work of Professor Browne on the toxæmias of pregnancy, and the Fitzgibbon method of measuring the relation of the fœtal head to the pelvis, mentioned. Authors are apt to think they are writing for a limited class of graduates; they sometimes forget that honour to whom honour is due is very pleasant reading and adds greatly to the interest of a book, for no school or individual is omniscient. The *ars obstetrica* has advanced beyond the provincial domains of any one University.

THE CONSERVATION OF THE FAMILY.—By Paul Popenoe. London: Messrs. Baillière, Tindall and Cox. Pp. ix plus 266. Price, 13s. 6d. net.

THIS is a book out of the common run, for it deals with the obvious. Such a statement may seem a paradox, but is not really so, for English-speaking peoples are disinclined to dissect their own feelings or to criticise what custom had ordained as most suitable for them. Mr. Popenoe is somewhat of a casuist, but he makes out a good case for monogamy and a large family, the latter an ideal which modern conditions are against for financial reasons. He is in favour of "the Lord will provide" attitude of mind in the father, but does not seem to realise that education has robbed women of the old time inferiority complex which compelled them to tolerate a position of serfdom, not to say martyrdom. He would seem to forget that the disabled, disgruntled, jaded, faded wife of the Victorian era who died in her early 'fifties is not a very fascinating or attractive picture for emulation to-day, for life is not a sprint but a long-distance contest. Celibacy is anathema to him, but it is generally recognised that the greatest cerebral output throughout the ages has been from the celibate, although from the point of view of the eugenist it may be selfish for a man to withhold his brains from a possible successor. Francis Galton demonstrated the advantages of fertility to the race, but the work of Abbé Mendel showed what proportion of stock were dominant and handed down the characteristics of that quality.

A most interesting book, full of good matter for the propagandist.

CLINICAL SURGICAL DIAGNOSIS FOR STUDENTS AND PRACTITIONERS.—By Professor F. de Quervain. Fourth English Edition. London: John Bale, Sons and Danielsson, 1926. Pp. 937, with 750 Illustrations and 7 Plates. Price, 42s. net.

PROFESSOR DE QUERVAIN'S work is so well known in its English dress that it is not necessary for the reviewer to do more than intimate the changes which have taken place since the last English edition was published in 1921. In the preparation of the present edition the translator has had at his disposal all the new matter which is to be incorporated in the forthcoming 9th German edition, so that the translation is abreast of the original, a very unusual feature.

In its general plan the book proceeds on anatomical lines, it commences with the diagnosis of fractures of the skull, and works steadily downwards, dealing in minute detail with conditions both common and rare of every part of the body, until it reaches the toe nails, whose affections conclude a work of 905 pages of text. The diagnosis of injuries and affections of the skull and brain has been brought up to date, the localisation of foreign bodies within the skull by the method of parallactic displacement and by stereoscopic radiograms is well described and the technique and value of the ventriculogram is fully dealt with. It is surprising to find no mention of the colloid gold reaction in an otherwise very complete table of reactions of the cerebro-spinal fluid in various conditions.

The surgery of the thyroid gland has been rewritten on the basis of a very simple classification, and the section on hyperthyroidism deals very clearly with the relationship between true Graves' disease and toxic adenoma. The importance of the estimation of basal metabolism in determining the functional efficiency of the thyroid gland is stressed. Swellings and tumours of the neck always present difficult problems in diagnosis, but if tackled on the system indicated, first glandular swellings; then tumours with liquid contents; then solid tumours, submaxillary, parotid, side of neck and supraclavicular region, and finally those of the back of the

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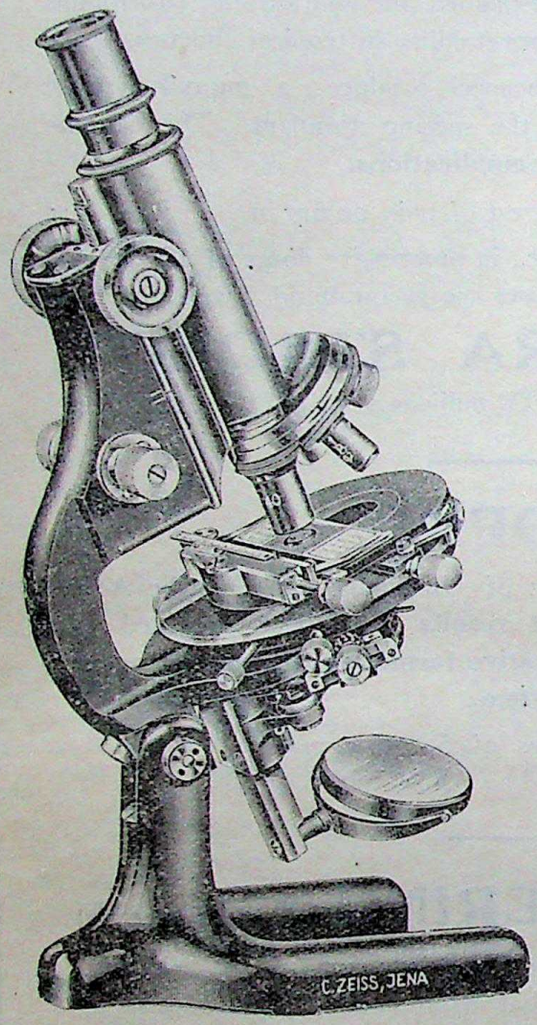

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neck, it will be rarely that a correct diagnosis cannot be arrived at. The sections on the diagnosis of diseases of the abdominal viscera are noteworthy for the number of useful interpretations of *x*-ray findings, normal and abnormal, and especially for some coloured drawings of the directions taken by intraperitoneal and sub-phrenic effusions, which should prove useful to the student. An otherwise excellent chapter on the surgical diseases of the stomach and duodenum, illustrated by many instructive diagrams of *x*-ray findings, is marred by the absence of any reference to the fractional test meal, to the value of the test for occult blood in the stools, or to the marked periodicity of the symptoms in early cases of gastric and duodenal ulcer, intervals of complete quiescence alternating with bouts of acute symptoms, all points which are considered by British and American surgeons to be of great value in diagnosis. The method of investigation of the gall-bladder by radiograms, after the injection of tetraiodophthalein is perhaps of too recent origin for inclusion, but its value is proved and we expect to see it mentioned in the next edition, also the chemical examination of the stools which furnishes information of value in the diagnosis of pancreatic disease, to which no reference is made.

We are told in the preface that the modern methods of diagnosis of renal disorders have been included, but we find no mention of McLean's urea concentration test and only a mere reference without details to the phenolsulphonephthalein test. Ambard's constant and the indigo carmine test hold the place of honour; we do not consider these methods to be the most modern, but we recognise that continental surgeons hold different views on this point. However this may be, there is no excuse for the statement that the normal blood urea content is 0.25 grm. to 0.5 grm. per 100 c.c., these are the figures for 1000 c.c. not for 100 c.c. and it is not the only instance of careless proof reading which we have detected. Pyelography as a method of diagnosis is asuming greater importance yearly, but it receives scant notice here, the sole reference to it being in the section on movable kidney.

Having drawn attention to points in which the book is not quite abreast of modern methods, it is a pleasure to comment on the excellent chapter on chronic appendicitis, with its careful description of the symptoms caused by ulcerative lesions of the colon, mucomembranous colitis, Dieulafoy's "typhocolite" and other conditions commonly diagnosed as appendicitis. Spinal injuries are treated in a manner which is a model of clarity and the diagrams from Kocher of the distribution of the spinal nerve roots are both artistic and helpful; mention must also be made of the excellent chapter on "sciatica." We can cordially recommend this new edition as a sound guide to surgical diagnosis, it is perhaps rather advanced for undergraduates and the style is at times rather obscure, but for students for higher examinations and for practitioners it should be of the greatest value.

W. L. H.

COMPENDIUM OF REGIONAL DIAGNOSIS IN AFFECTIONS OF THE BRAIN AND SPINAL CORD.—By Professor Robert Bing. Third English translation, by F. S. Arnold, B.A., M.B. London: Wm. Heinemann (Medical Books), Ltd., 1927. Pp. 204, with 102 Illustrations. Price, 15s. net.

THE object of that branch of the science of neurology denominated regional diagnosis is to determine the exact anatomical position of the lesion. This, of course, is of primary importance, and in recent years the subject has become a great deal more exact, although more complicated than formerly.

The book under review has been a standard work on this subject for many years, and three editions have been translated into English.

This edition, translated from the 6th German edition, presents an excellent and full account of the subject.

The first section deals with lesions of the spinal cord and we are introduced to the subject by a short but very clear description of the anatomy and physiology of the cord. This is followed by explanations of the meanings of the various disturbances of function due to lesions in different parts of the cord. The descriptions are clear, the conclusions arrived at are logical, and the diagrams which illustrate the text are in many cases novel and are all excellent.

The second section deals with cerebral lesions. The anatomy is well described and very well illustrated. A chapter on general rules for localisation is of particular interest.

The localising values of disturbances of vision and disorders of speech are described in as clear a manner as such complicated subjects could be.

The book is well printed and the numerous diagrams deserve great praise. Many of them are the particular invention of the author and give the book a personality which is so often absent from a work of this kind.

Although rather too advanced for the average medical practitioner in India, this book should prove invaluable to any one wishing to specialise in neurology.

H. H.

THE HEPATIC PRINCIPLE, ANABOLIN, DETOXICATION BY THE LIVER AND THE CONTROL OF FUNCTIONAL HYPERTENSION.—By H. R. Harrower, M.D. London: Baillière, Tindall & Cox, 1927. Pp. xii plus 147. Price, 10s. 6d. net.

IN his preface the author states his case as follows:—

"1. The liver is a gland of internal secretion, with its endocrine influence involving its detoxication service, and indeed largely controlling it.

2. The product known as anabolin is an original substance separated, from the liver cells, first prepared in stable form and made available to the profession under my direction, which is of clear cut therapeutic advantage in the treatment of certain toxæmias accompanied by hypertension.

3. Anabolin is a newly developed substance practically unknown by any name in the literature before 1925, though referred to by me in 1914 as 'a substance at present unknown.'

4. This new preparation is neither histamine nor choline, nor a mixture of these substances; and the effects which have followed its administration clearly are not due to peptone or protein shock.

5. Its effects upon functional hypertension and the conditions which accompany it have been so marked that evidence has been accumulated to support my personal conviction that it may be considered as the internal secretion of the liver.

6. The use of anabolin in general practice has not been followed by deaths or even discomfiture due to its administration, and the fears expressed by the uninformed as to its limitations and dangers happily have not materialized. On the contrary, many of the reports following its administration have been remarkably encouraging."

In conclusion the author adds that it is fully realized of course that anabolin is not "a cure for high blood pressure."

From a perusal of the above treatise, one is left in no doubt that the author has succeeded in isolating from the liver a depressor principle which has the power in properly selected cases of lowering excessive blood pressure.

The method of presentation, however, savours of the art of the manufacturing chemist. The author is stating his own case and, therefore, without imputing to him undue bias or partiality, we feel we are justified in issuing a word of caution to the reader, not to accept without further satisfactory proof all the statements made in the volume under review.

PRINCIPLES OF CHEMISTRY.—By Joseph H. Roe, Ph.D. St. Louis: The C. V. Mosby Company, 1927. Illustrated. Pp. 378. Price, $2.50.

THE author has attempted to deal with the whole province of chemistry—inorganic, organic, physical and physiological—in a small volume. The extremely lucid and popular style is very well suited to the class of

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readers for whom it is written. Nearly half the book is devoted to inorganic chemistry, with one or two chapters on physical chemistry. The first ten chapters, with the applications in medicine and hygiene, have been very well written and afford a very instructive study. The treatment of the metals is rather scanty and the addition of some of the important compounds used in medicine would have increased its usefulness.

In the only four chapters devoted to the whole of organic and bio-chemistry, the treatment of the former is rather poor, considering the importance of that branch of chemistry. The chapter on vitamines is interesting, and the other chapters deal more with physiology proper than any principles of chemistry.

Part II of the book, dealing with laboratory experiments, will prove a very useful manual for practical work.

On the whole, the book affords a very interesting study and the author is to be congratulated on this new type of textbook.

S. G.

THE ELEMENTS OF GENERAL ZOOLOGY.—By William J. Dakin, D.Sc., F.Z.S. Bombay: Oxford University Press, and Constable & Co., 1927. Pp. xvi plus 496. Price, 12s. 6d. net.

THIS book on the elements of general zoology is different from other books on the subject in that the author has aimed at going more fully into the functions of the structures he is describing, these being usually neglected in the ordinary textbooks on the subject. In describing such organisms as an amœba or paramœcium the author deals fully with their nutrition and such functions as respiration, excretion, reaction to physical and chemical agents, etc. In the section dealing with the biology of the multicellular organisms he describes the process of their evolution, and the working of the improved systems which have been evolved. In the last chapter general instructions for laboratory work, such as is required for the first examination for medical degrees are given. We welcome this book, which we consider constitutes an important step towards making the teaching of zoology of real help to students of medicine.

THE INDIAN MATERIA MEDICA.—By K. M. Nadkarni. Published by K. M. Nadkarni, Bombay. (Post Box 3558), 1927. Pp. xviii plus 1142, with Appendix and Index. Price, Rs. 11 or 18s.

THIS book, which is a compilation, deals with the drugs used in the indigenous systems of medicine, Ayurvedic and Unani, and also describes the home remedies commonly used by the people in this country. In the description of drugs, Sanskrit names as well as the common names applied to the drugs in the important Indian dialects are given. The habitats of plants the parts used for medication, their active principles and their actions and uses, as given in Ayurvedic and Unani books, are described; the important preparations of these drugs used in indigenous medicine and their mode of manufacture are also given. No attempt, however, has been made to include the recent scientific work on some of the drugs which has been carried out during the last decade. The book will interest students of the indigenous systems and those engaged in research work on the indigenous drugs of India.

A TEXTBOOK OF EXODONTIA.—By Leo Winter, D.D.S. St. Louis: The C. V. Mosby Company, 1927. Pp. 364, with 329 Illustrations. Price, $7.50.

THE first chapter of this book deals with general anæsthesia, and is contributed by J. T. Gwathmey, M.D. The writer prefers the sequence of gases which is so much in vogue in the United States. He suggests the use of nitrous oxide and oxygen, and if the patient is not under in 3 or 4 minutes, ethylene or warm ether is to be added to complete the narcosis. For a preliminary medication he is in favour giving an intramuscular injection of 2 c.c. of a 50 per cent. solution of magnesium sulphate combined with 2.5 per cent. novocain and ⅙th grain of morphin sulphate.

Dr. Winter continues the rest of the book. He is definitely of the opinion that "novocain is the most commendable of all the local anæsthetics known at the present time," and recommends its use for all dental operations. Apothesine, parathesine, tropocaine, halocaine, beta-eucaine, stovaine, alypin, butyn and tutocaine are each discarded in turn, owing to their unfavourable properties. The author is of the opinion that the trend in general dental surgery is away from general anæsthesia. Most American nose and throat specialists prefer local anæsthesia for oral surgical work, whenever possible.

The chapter on extra-oral injections is very well written and illustrated. The technique of injection of both infiltration and conductive anæsthesia is given in detail. A very desirable feature has been added in the shape of a chapter on the control of bleeding in oral surgical operations. The author gives the latest views upon blood coagulation and also describes blood tests which are suitable for use by dental surgeons.

The chapters on extraction are full of instructive details for all dental surgeons. Difficult cases, such as the removal of buried, misplaced and impacted teeth are dealt with in a masterly manner. The *x*-ray technique for the localization of misplaced teeth is very well described.

The book is excellent for those desiring to improve their knowledge in this branch of dental surgery. It is very well printed, illustrated and got up.

R. A.

TIGER TRAILS IN SOUTHERN ASIA.—By R. L. Sutton, M.D., Sc.D., F.R.S. (Edin.). St. Louis: The C. V. Mosby Company, 1926. Pp. 207, with 115 Photographic Illustrations. Price, $2.25.

VERSATILITY in genius is rare, and it is not often that one comes across it. Yet Dr. Sutton is a distinguished authority on dermatology, and also a redoubtable tiger-slayer; indeed his previous book "An African Holiday" had a very wide circulation as a work on travel and sport. We leave it to the followers of Freud to trace the connection between a professional interest in "skins," and tiger-shooting as a hobby and relaxation, but we thoroughly enjoyed Dr. Sutton's superbly illustrated book.

It deals with a holiday spent in tiger-shooting in Indo-China and Assam. It abounds in good stories, fascinating accounts of tribal customs and folk-lore, and is profusely illustrated with original photographs. It is a book which will make a strong appeal to the naturalist, the anthropologist, and the "shikari." Apart from the wonderful photographs of wild carnivora and elephants, some of the snake photographs are exceedingly good. Further, the publishers are to be most warmly congratulated on the excellence of its get-up and publication.

As a medical man, Dr. Sutton has wisely chosen the wilds for his hobby; and to any medical man in search of a fascinating volume for a leisure afternoon, or to any medical man who takes "shikar" seriously we would especially recommend this delightful volume of travel and adventure in real life.

SURPLUS FAT AND HOW TO REDUCE IT.—By W. F. Christie, M.D. London: Wm. Heinemann (Medical Books), 1927. Pp. 107. Price, 6s.

THIS is primarily a book for laymen, but one of considerable interest and importance to the medical profession. Also in these days of so-called rapid obesity cures, it is a book which is badly wanted, for it summarises the common-sense medical point of view of obesity. Further, it is most amusingly illustrated; indeed the artist deserves a word of praise to himself.

Dr. Christie's message to the obese is that they can cure a condition of embonpoint, which was not intended by Nature, if they will really take the matter in hand, and not seek a miraculous and impossible cure. Inheritance is often claimed to be an important factor in obesity, but the author claims that it is inheritance of

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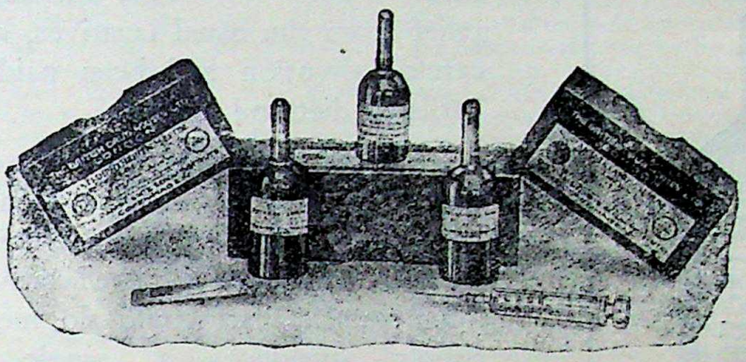

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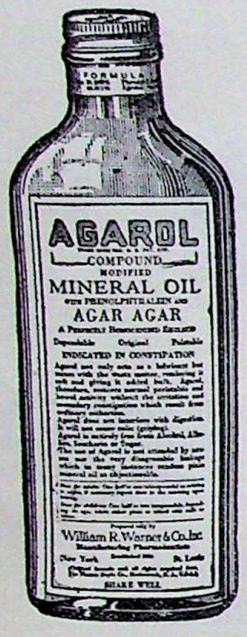

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lethargic conditions and of conditions of environment leading to obesity which is of importance rather than direct inheritance of the condition itself.

In chapter 2 the author discusses the body as a furnace, and in chapter 3 the chemistry of the body; both being a simple exposition of fundamental biological principles. Chapter 4 on the ideal figure gives useful tables of the average weight to height for both sexes at different ages. There follow chapters on the primary causes of obesity,—obesity due to self-indulgence in diet, and freaks and curiosities. In discussing the dangers of obesity special attention is paid to the relationship of diabetes to the condition.

In outlining a rational system of treatment, the author first deals with the maintenance diet in detail, giving fuel and caloric values. He next deals with reducing diets, and here again the subject is gone into in full detail. Voluntary muscular exercise is then discussed and recommended far and above massage and such measures as the Bergonié chair, which are poor substitutes. A chapter follows on the use of light and radiant heat baths, with a word of warning to those with a fatty heart. For glandular products the author has but little use; whilst starvation treatments, he considers, may do more physical harm than good.

The book is well written, amusingly illustrated, well balanced, and should be especially suitable for doctors to recommend to their patients. It also includes a selected bibliography.

PRASUTI PARICHARYA.—By Baman Das Mukerjee. Pp. 192. 132, Dharamtolla Street, Calcutta. Rs. 2.

THIS is a short treatise in plain Bengalee in which the author attempts to educate the expectant Bengalee mother on matters of vital importance for her own health and the health of the newborn child. The insanitary social customs and the evils of ignorance are rightly exposed. The instructions how to meet the emergencies of labour cases should be very useful in every Bengalee household before the arrival of the doctor in the house. The authorities of maternity and child welfare work would do well to recommend this useful book to the lay public to educate them in the subject.

The author has a great reputation as a gynæcological and obstetric practitioner in Bengal and therefore his writings on pre-natal and ante-natal care will be very welcome in Bengalee homes. And as we desire heartily to remove the ignorance of the people as regards the conditions of the lying-in rooms and so induce them to take more care of the expectant mothers (to decrease both the infant and maternal mortality) we can strongly recommend this book in which the subject is lucidly put forward to the Bengalee lay public.

SHOULD WE BE VACCINATED? A SURVEY OF THE CONTROVERSY IN ITS HISTORICAL AND SCIENTIFIC ASPECTS.—By Bernhard J. Sterm. New York and London: Harper and Brothers, 1927. Price, Rs. 2.

THE medical profession is often accused of being an esoteric sort of trades union, jealous of its knowledge, intolerant of lay criticism, issuing its mandates and fiats on health and disease with some of the authority of ecclesiastical "bulls." Shorn of much of its exaggeration, there probably is a small substratum of truth in this statement. The profession until perhaps very lately, has as a whole neglected to recognise that the problems of disease and health are intimately bound up with intricate psychological and sociological factors affecting man both in the individual and in the herd. The present volume, with vaccination against small-pox as its text, illustrates these facts admirably. The writer is not a medical man but a well-known sociologist, and his review of the vaccination controversy from its inception to the present day should be read by everyone interested in the application of science to the welfare of man.

The controversy has ranged round four main points: firstly, the truth of the contentions of Jenner and his advocates; secondly, the religious aspect, whether it was not blasphemous to transfer bestial diseases to man, made in the image of God; thirdly, the interference with individual freedom; and lastly, the so-called "Malthusian" principle; that it was a mistake to interfere with Nature's measures by which so-called adjustments of population were made. Further, the vested interests of the inoculators were at stake and the anti-vaccinationist ranks have always been replete with those whose minds lead them to join any movement, where, as a vehement minority they will have the chance of a thorough-going bitter controversy with a powerful opposition claiming to be authoritative. It should be remembered that the Great War has been cited as a combat on one of these very principles. Should the State subordinate and ignore the rights and wishes or even convictions of the individual when these are antagonistic to the best interests of the State? Or should the opinions and wishes of the individual, even if these are possibly wrong, be the determining factor in state policy? Germany illustrated the first point of view, and shall we not in this very matter of vaccination allow her view-point to be absolutely correct? Jenner's controversial methods did not help to allay the opposition of honest opponents; the fundamental truth of the protection of cow-pox vaccination against small-pox he argued with vehemence and sometimes with bitterness, but with the same vehemence did he emphatically hold that cow-pox was derived from the greasy heel of horses, that vaccination gave permanent immunity and that there were two forms of cow-pox, "true" and "spurious." We recommend the book to our readers not only for its scientific value, but as a study in the political, economic and religious factors that inevitably complicate not only this particular one, but many other public health problems.

A. D. S.

Annual Reports.

REPORT ON THE EUROPEAN MENTAL HOSPITAL, RANCHI FOR 1925. By LIEUTENANT-COLONEL O. A. R. BERKELEY-HILL, M.D., I.M.S. RANCHI, SUPDT., GOVT. PRINTING, B. & O.

COLONEL BERKELEY-HILL'S annual reports are always interesting, and this one is no exception to the rule, although he was on leave from February to October, during which period Dr. J. N. J. Pacheco and Captain G. H. Fraser, I.M.S., in turn were in charge.

The hospital continues to receive European, American and Anglo-Indian patients from the whole of Northern India, and during 1925 the accommodation was increased from 180 to 198 beds. Fresh admissions during the year totalled 39, whilst 159 patients were resident in the hospital at the beginning of the year. Colonel Berkeley-Hill notes that "during the year there was one flash of light, not a very strong one, perhaps, through the gloom which seems to envelop everything in India associated with mental treatment and prophylaxis," when the Hon'ble Mr. Haroon Jaffer moved a resolution in the Council of State recommending that the provincial governments in India be asked to investigate the best means of dealing quickly and adequately with cases of mental defectives, particularly of the minor and curable kind.

Seven voluntary boarders were admitted during the year and were accommodated in the new borderline cottages in October. These cottages have also been found to be very suitable for convalescent patients, who much appreciate the freedom and change of environment. The daily average strength of the hospital patients in all was 170.6, and a further increase is to be expected in the future. Of 206 patients treated during the year, 120 came from Bengal and 51 from the United Provinces. The percentage of cures to total admissions was 29.7 per

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cent. There were only 6 deaths during the year, and the death-rate is much lower than that in the two principal mental hospitals in the United Kingdom.

"To my regret" writes Colonel Berkeley-Hill, "during the year proper advantage was not taken of the system of allowing patients out on trial for a period of two months to test their fitness for complete discharge. The temporary suspension of this practice may be attributed to the fact that relatives of patients deserving of such leave could not be persuaded to take them out on trial after furnishing the necessary security." The proper supervision of discharged patients is also a matter where help is badly needed. "With some notable exceptions—chiefly the Calcutta League of Women Workers and the Lahore Charitable Association—neither public bodies nor private persons will come forward in the big towns to help us."

A set-back recorded during the year was the refusal of the Board of Trustees to retain the services of a dental surgeon. Buccal and oral sepsis Colonel Berkeley-Hill regards as of very considerable importance in the pathogenesis of mental diseases, and he contrasts the removal of the dental surgeon at Ranchi with the much more enlightened ideas which prevail in the United Kingdom.

Occupational therapy has made steady progress during the year, the most noticeable improvement being in the morale of the patients. A letter from America tells of the appreciation of the articles manufactured at Ranchi at an exhibition held in connection with the American Occupational Therapy Association. The establishment of a printing press and the installation of a steel loom for weaving cloth have added to the forms of occupation available, whilst brush-making is still another form of employment under consideration.

During the year Colonel Berkeley-Hill, whilst on leave, paid a visit to the boarding-out system for mental patients in practice at Gheel in Belgium (an account of which he has previously given in our columns), and expresses himself as very strongly in favour of the system. "There can be very little risk attending an increase of the freedom already given the patients at the Ranchi Mental Hospital"; hence parole was extended to all male patients except two and to all female patients, with no untoward results.

Of other activities the hospital band has rendered splendid service, and went into camp with the Chota Nagpur Regiment: the cinema gave its first performance in December 1924, and has proved an unqualified success with the patients, whilst the games and sports department was thoroughly overhauled and re-equipped during the year.

The chief event of the year perhaps was the opening of the cottages for paying patients. These, Colonel Berkeley-Hill reports, are a splendid success, and suitable not only for private patients, but also eminently so for convalescent patients. The scheme for improving the water-supply was completed, and regular chemical and bacteriological tests showed that the new supply was of good quality. Defective drains still remain as a problem to be tackled, when—if ever—funds permit.

Receipts during the year totalled Rs. 6,00,968, and the total expenditure reached exactly the same figure. A new system was introduced by which the contributions from the different provincial governments were paid in advance. There was a total decrease in expenditure as compared with the previous year of Rs. 3,41,044, due chiefly to the fact that in the previous year charges for quinquennial repairs by the Public Works Department had to be met, which was not the case in 1925. Finally, Colonel Berkeley-Hill notes with disapproval that the proposal to have a trained alienist as deputy superintendent has not yet received sanction or even due consideration. "The procedure of bringing in from outside some medical officer to act temporarily for the permanent medical superintendent is extremely disadvantageous. So long as the Board adhere to the present policy, so long will it be impossible to maintain an uninterrupted endeavour towards progressive improvement in every direction."

ADMINISTRATION REPORT OF THE JAILS OF BIHAR AND ORISSA FOR THE YEAR 1925. By LIEUTENANT-COLONEL I. M. MACRAE, O.B.E., M.B., I.M.S. PATNA, SUPDT., GOVT. PRINTING, B. & O. PRICE, RS. 2.

THE office of Inspector-General was held by Lieutenant-Colonel W. T. Finlayson, D.S.O., I.M.S., throughout the year. The total accommodation available during the year in jails and sub-jails was 10,865, and the daily average of prisoners of all classes and of convicts respectively were, 6,227 and 5,298. Youthful and juvenile offenders under the age of 20 years numbered 811 as against 764 in the previous year. Of these, 30 boys and 3 girls were under 15 years of age; 21 of the boys were sent to the reformatory school at Hazaribagh, and the remainder, as well as those between 15 and 20 years of age, were either detained in the jails of the districts where they were convicted, or were transferred to the Juvenile Jail at Monghyr, the Central Jail at Bhagalpur, or the District Jail at Bankipore.

At the Juvenile Jail at Monghyr the total numbers dealt with were 410, and the daily average population was 132. The Government syllabus for primary schools was closely followed in the different classes, and an examination system was introduced in each class of the Hindi, Urdu and Oriya sections of the school. Short term prisoners are employed in gardening and masonry, whilst long term prisoners are taught carpentry, blacksmithy, tinsmithy, weaving, tailoring and cane work in addition. Instruction in the night school was continued during the year, and this has helped considerably in preparing for examinations. The boys were examined by the District Inspector of Schools. A Mohammedan religious instructor has been secured for the Mohammedan boys, but so far no suitable volunteer has come forward for the Hindu boys. The Juvenile Prisoners' Aid Society started at Monghyr is unfortunately in a languishing condition, and threatened with bankruptcy unless local philanthropic workers, will come forward and interest themselves in it.

The percentage of prisoners receiving short term sentences of three months or less was 58, and showed an increase on the figure for 1924. The covering Government resolution states that it is difficult to frame rules against the infliction of such sentences, but directs the attention of the Courts to the matter.

There were no persons convicted during the year in the province of any political offence, but three political detenus were received from Bengal. Escapes during the year were 13 as against 7 in the previous year, but there was an appreciable decrease in the number of jail offences and punishments.

The entire expenditure on the department during the year was Rs. 11,64,494 and the average cost per prisoner for the year was Rs. 186-15-9. Total cash earnings amounted to Rs. 60,928, as against a deficit for 1924. At Buxar the principal industries in the jail are tent-making, tailoring and cotton-weaving; at Bhagalpur blanket-weaving, tailoring, blacksmithy and carpentry; at Gaya oil-pressing; and at Hazaribagh the manufacture of aloe goods, oil-pressing and cloth-weaving.

The general state of health in the jails of the province showed a marked improvement as contrasted with previous years. All four central jails, Buxar, Bhagalpur, Gaya and Hazaribagh showed a remarkable drop in death-rates as compared with 1924. The daily average sick-rate fell from 33.9 per mille in 1924 to 23.6 per mille in 1925; the total number of deaths from all causes declined from 133 in the previous year to 73, and death-rate of 11.7 per mille was recorded as against one of 21.2 per mille in 1924. At Hazaribagh Central Jail the appointment of a wholetime Superintendent has led to a remarkable improvement in the health of the prisoners. On the other hand, some of the district jails—notably that at Chapra—continue to report bad figures, chiefly owing to the bad state of health of many of the prisoners on their admission. Dysentery, which used to be a very important cause of death, has declined, whilst ankylostomiasis is

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now treated by carbon tetrachloride instead of oil of chenopodium, with much improved results.

During the year the scale of pay of probationary assistant jailers was raised from Rs. 30 p.m. to Rs. 40 p.m., and a new and improved graded scale of pay was introduced for jailers and assistant jailers.

As a result of the recommendations of the Indian Jails Committee, the following further changes were made during the year under report. The religious instructors or ministers of religion appointed for imparting religious or moral instruction to prisoners are now allowed conveyance hire for the journeys performed by them to and from the jails, up to a limit of Rs. 10 a month. The rules regarding religious observances have also been extended to subsidiary jails, where they are followed as far as circumstances permit. The practice of guarding under-trial prisoners by convict officers has been abolished, and extra warders have been sanctioned for replacing all convict officers employed in the under-trial wards of the jails. The practice of employing convict officers above the grade of convict night-watchmen in the Buxar Central Jail, which has been set apart for the confinement of habitual prisoners, has also been abolished and the strength of the warder guards increased accordingly. A Discharged Prisoners' Aid Society has been established at Buxar through the public spirit and philanthropy of the gentry of the locality, and Government have made an initial grant of Rs. 250 to it and have also undertaken for the present to contribute annually an amount equal to the subscriptions obtained locally in any one year. The star class system has been introduced in the Hazaribagh Central Jail. According to this system, the best of the casuals are separated from the worst to avoid any possibility of contamination. The system of holding night schools for the star class prisoners has also been introduced. An encouraging result of the experiment already noticed is that there is practically an entire absence of jail offences amongst this class of prisoners. They appreciate what is done for them, carry out their full tasks and give no trouble. Compulsory education for all prisoners of 25 years and under, sentenced to more than 2 years and whose mother tongue is Hindi, has been started in the Gaya Central Jail as an experimental measure. The progress made by this class of prisoners is satisfactory.

REPORT ON THE JAIL ADMINISTRATION OF THE PROVINCE OF ASSAM FOR 1926. By COLONEL G. HUTCHESON, M.B., I.M.S. SHILLONG, ASSAM SECRETARIAT PRINTING OFFICE. PRICE, RE. 1.

COLONEL C. H. Bensley, I.M.S., on his return from leave, held charge of the department from the 1st March to the 31st October, when he retired. Lieutenant-Colonel H. Innes, I.M.S., was in charge for the remainder of the year, Colonel Hutcheson having taken over in 1927. We have often commented on the interest of Colonel Bensley's reports. To quote the covering Government resolution "Colonel Bensley was greatly interested in the question of jail reforms, and particularly in the welfare and reformation of the prisoners in his charge. By his retirement the prisoners have lost a true friend and the Government an experienced and able adviser."

The most noticeable feature of the report for 1926 is the marked improvement in the health of the prisoners. The number of admissions to hospital was the lowest on record for many years, whilst the average number of sick daily was lower than in any year except 1924. With a daily average of 2,320 prisoners, the total number of deaths during the year was 47, and the death-rate 20.26 per mille, a figure which compares very favourably with the general provincial death-rate of 23.02 per mille. Another very satisfactory feature of the report is the improvement in discipline, shown by the reduction in the number of jail offences, while the number of convicts who escaped from jail fell from 7 in the previous year to 3 in 1926, the smallest number on record for two decades.

Four prisoners were admitted who were under 16 years of age, of whom three were sent to the Reformatory School. The fourth, convicted under the Railways Act, was sentenced to a term of 14 days simple imprisonment. The number of adolescent prisoners showed a further decrease; on the other hand there was a slight increase in the number of female prisoners admitted, and also in the number of short term sentences. It is interesting to note that 94.9 per cent. of the prisoners admitted were illiterate, showing that the jail population is derived from the lower classes of the community.

No less than 17 per cent. of prisoners admitted during the year were re-admissions of former prisoners, and "habituals" numbered 328 out of a total of 3,307.

Perhaps one of the most cardinal difficulties in jail administration in India is that of recruiting a competent warder staff. "The position in regard to recruitment of the warder staff is becoming exceedingly difficult," writes Colonel Hutcheson. "Many of the men presenting themselves for service have been previously refused admission into the police, and are therefore often of a poor type. There are frequent resignations, and superintendents are forced to fill vacancies with any men who may be available, with little or no choice as regards selection. The service is unpopular for a number of reasons, the chief being inadequate pay, long hours, few nights in bed, little leave, poor housing and the constant risk of punishment, dismissal or prosecution for breaches of discipline and escapes..... Men entitled to leave on full pay are frequently required to find a substitute..... I would recommend that a leave reserve of at least 10 per cent. be sanctioned, and that free railway and steamer return passes be granted to all warders, including their families, once in every three years.....It is most essential that the whole staff should be provided with comfortable quarters and provision be made for married quarters for at least 50 per cent. of the strength."

The gross profits derived from the employment of prisoners amounted to Rs. 63,751, with an average of Rs. 33-12 per head, an improvement on the record for the previous year. The total gross expenditure on the department showed an increase on 1925 and totalled Rs. 3,57,747, the average cost per prisoner, after deducting earnings being Rs. 125-13-2. Little progress was made during the year with the reconstruction of Tezpur jail, the first of the important building projects which are required if the Assam jails are to conform to the standards demanded by modern ideas of jail administration. A sum of Rs. 1,50,000 has been sanctioned in the current year's budget, however, and progress should now be more rapid. Owing to limited accommodation at the Tezpur Mental Hospital a considerable number of criminal and non-criminal lunatics had to be accommodated in the jails, and special arrangements made for them, but the reconstruction of the Tezpur Mental Hospital has now been commenced and ample provision is included in it for all the requirements of the province.

The chief industries were bamboo and cane work, weaving of cotton clothing, blanket-making, and brick manufacture. Arrangements are in hand to train prisoners as carpenters and blacksmiths.

The covering Government resolution refers regretfully to the attacks made on the department by politicians in the Legislative Council.

"The administration of the Jail Department was again the subject of criticism in the March session of the Legislative Council. The charges brought against the department were based mainly on experiences of 1921 and the recital of the improvements effected by Government in recent years met with the rejoinder that, however genuine the desire of Government and the superior officers of the department to improve conditions in the jails, their efforts are checkmated by the subordinate staff. It is impossible to deny that there are openings for malpractices in the administration of a jail, but this is a matter which has during recent years engaged the earnest attention of the Inspector-General, and the Governor in Council is confident that every effort is being

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and will be made to prevent them. There was a notable tendency during the debate to make light of the work done by non-official visitors and religious instructors. The Inspector-General has not referred to the former in the Report under review but he has on other occasions stated that the non-official visitors have been of the great assistance to him and his officers and that their criticisms and suggestions have been of great value. Since 1923, the visitors in each jail have worked together as a Board and this arrangement has greatly increased the value and weight of their suggestions. The services of the religious instructors are greatly appreciated by the prisoners and the only criticism of their work which the Inspector-General makes is that the attendance of some of them is irregular. The non-official visitors and the religious instructors have undertaken a public duty and give their services without remuneration, and while constructive criticism of their labours would be welcome, the Governor in Council regrets that any member of the Legislative Council should have thought fit to describe them indiscriminately as men who neglect their duties and responsibilities. The need of Discharged Prisoners' Aid Societies was mentioned in the debate. This project has the cordial support of the Government, who have in Resolutions of recent years appealed to public-spirited persons to come forward and organize such societies. Government support will not be lacking, but the initiative must rest with private individuals or associations as the societies, to be successful, must be non-official in character. No response has as yet been made to the Government's appeal, but the Governor in Council trusts that the growing public interest which is being taken in jail administration will not be confined to the physical comfort of the prisoners within the jails, but will extend to measures designed for their normal well-being after their release from jail."

Correspondence.

THE USE OF THE MICROSCOPE IN THE PRACTICE OF TROPICAL MEDICINE.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—A patient aged 36 years, suffering from anæmia, with a hæmoglobin index of 50 per cent., and gradual loss of appetite and weight came to me for treatment. He volunteered the statement that he was a chronic sufferer from piles and passed blood from time to time in his stools.

I prescribed salol, gr. v. with *isufghol* gr. xx. and asked him to bring a specimen of stool for microscopic examination. He started *hakim* treatment, however, until I was called in to see him again a week later. I found him in an almost moribund condition, passing a stool full of blood every ten minutes or so, the stools, however, containing offensive fæcal matter.

I at once put him on to cardiac stimulants and took a stool for microscopic examination. I found it flooded with actively motile vegetative *Entamœba histolytica*. An injection of gr. 1 of emetine immediately relieved his acute symptoms. A course of 8 injections (only) of emetine was given, as the patient's state was very weak, and I did not like to push the drug. This completely cleared up his symptoms, but cysts of *Entamœba histolytica* were still present in his stools. The patient is now on Yatren (105) and tonics, and has gone to the hills for a change of climate.

The case is of interest, for, in the absence of microscopic examination of the stools, a wrong diagnosis would almost certainly have been given.—Yours, etc.,

M. P. BHATNAGAR, D.T.M. (Bengal).

RAMPUR STATE, U. P.
22nd June, 1927.

A CASE FOR DIAGNOSIS; (? VARIOLA OR PURPURA HÆMORRHAGICA).

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—On the 14th June, 1927, I was called in to attend a Hindu boy, aged about 13 years, whom I found to be unconscious, with a temperature of 103.4°F., and with constipation of two days' standing. I was told that prior to this illness, the boy had always been healthy. The day before he had been apparently in perfect health, talking and playing normally. The fever had set in during the night before I was called in.

On shaking the patient, he opened his eyes, but would not speak. I examined him very thoroughly, but could find no evidence of disease in any organ; heart, lungs, liver, spleen, tonsils and throat all being normal. I prescribed a diaphoretic mixture and an enema, the latter being returned with no evacuation of the bowels.

Three hours later I saw the patient again. The temperature was still 103°F. Thinking that the condition might possibly be due to malaria, I gave an intramuscular injection of 2½ grains of quinine bihydrochloride.

The next morning, 15th June, the patient was in the same state. He had got up once during the night to pass urine, but had not been able to get back to bed. I could still find no cause for the fever. There had already recently been three cases of small-pox in the family whilst the disease was very prevalent locally at the time. The patient showed no vaccination marks and there were no pox marks on his face from previous small-pox. The same evening, the temperature rose to 104.4°F., and two or three small lesions appeared on the brow and face. These did not resemble typical small-pox eruptions, but were blackish and raised above the skin surface. The diaphoretic mixture was continued, and as the parents refused hydrotherapy, cold sponging to the head was resorted to.

On the 16th June—the fourth day of illness—eight or nine more black raised spots appeared on the brow and face. The temperature began to fall very rapidly, and the patient collapsed and died at 3 p.m.

The case was an obscure one. Purpura hæmorrhagica is a very rare disease. On the other hand, small-pox was epidemic in the neighbourhood at the time; there had been three cases in the patient's family; he was not vaccinated nor protected by a previous attack; and the eruption appeared on the third day of fever and was situated on the face and brow. The disease therefore appears to have been "black" small-pox.

A peculiar feature of the case was the complete loss of speech. On shaking the patient, he opened his eyes, and if an arm or leg was pinched he removed it; also when pricked with a needle to test sensibility he screwed up his face as if crying.—Yours, etc.,

P. MUKERJIE, L.M.P.,
Assistant Medical Officer.

BARMAN DISPENSARY,
21st June, 1927.

ACETYLARSAN IN THE TREATMENT OF SYPHILIS.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—An arsenical preparation as rapidly efficacious as novarsenobillon, which, however, can be administered absolutely painlessly by the subcutaneous or intramuscular route, is deserving of attention. Acetylarsan, prepared by the Laboratoire des Produits, Usine du Rhone, appears to be such a product. Having recently tried their product "Infantile Acetylarsan" on two cases, I may perhaps be permitted to give the following details with regard to them.

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2nd day	247	246
3rd day	246	205
4th day	206	190
5th day	190	175
6th day	170	162

Patient then placed on Anabolin Tablets, and B.P. steadied to 160 and remained there. Diet enlarged. General health showed great improvement.

ANABOLIN

reduces blood pressure

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The drug has the advantage of being quite painless on injection, and does not cause gingivitis, as is the case with bismuth preparations in some child patients.—Yours, etc.,

HEM CHANDRA TAPADAR,
Sub-Assistant Surgeon, late I. M. D.
P. O. BAJITPUR,
MYMENSINGH DISTRICT.
22nd March, 1927.

REGISTRABLE QUALIFICATIONS.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—In connection with my letter on p. 57 of your issue for January 1927, I should like to make it clear that that letter was written entirely on my own initiative, and that I was not deputed by this State or any official body to undertake the enquiries which I made in Europe with regard to the questions of medical education and registration. The subject, however, has always seemed to me to be a most important one in India. After attaining a qualification registrable in Great Britain, I joined the British Medical Association and attended their annual conference at Bradford, also annual conferences at Brighton of the Royal Institute of Public Health, and of radiologists in London. This gave me an opportunity of discussing with heads and registrars of several institutions the qualifications demanded for registration by the General Medical Council of the United Kingdom.

The degrees of L.S.A. (London), L.A.H. (Dublin), and the final conjoint degree of the Royal Colleges of Physicians and Surgeons are accepted by the General Medical Council for registration. In India, the M.B. degrees of the universities of Bombay, Calcutta (recently suspended, but now again recognised), Madras, Lahore, Lucknow, Colombo, and Singapore are recognised as registrable by the General Medical Council of Great Britain. As far as I know, all the regular licentiateship qualifications of the English, Scottish and Irish Examining Faculties are recognised by the General Medical Council. There is, however, no recognition of the Licentiateships of the Colleges of Physicians and Surgeons in Bombay, or of the State Medical Faculty in Bengal. This presumably must mean that the General Medical Council of Great Britain recognise the Indian university degrees as equivalent to the registrable qualifications in Great Britain, but not the Licentiateships of the other Indian examining bodies.

On the other hand, during the war, temporary commissions in the Indian Medical Service were given to medical men who had only passed the Membership examination of the College of Physicians and Surgeons in Bombay, or the examination held by the State Medical Faculty, Bengal,* and some such officers have been given higher civil appointments since. Also many past and present officers of the I.M.S. with Home qualifications of L.S.A. (London), L.A.H. (Dublin), or the conjoint M.R.C.S. (England), L.R.C.P. (London) have obtained high colonial and civil appointments.

Does this mean that the General Medical Council of Great Britain definitely considers the Licentiateship of the Indian examining bodies to be unequal to the Licentiateships of the British examining bodies? One presumes so; but perhaps a case can be made out for investigation and recognition.—Yours, etc.,

K. M. HIRANANDANI.
HEALTH AND HYGIENE INSTITUTE BUREAU,
HYDERABAD, SINDH.
7th June, 1927.

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* We presume that our correspondent is correct in this statement, but publish it subject to verification.—EDITOR, *Indian Medical Gazette*.

Service Notes.

APPOINTMENTS AND TRANSFERS.

Colonel C. R. Bakhle, I.M.S., to be Honorary Physician to the King, Indian Military Forces, *vice* Colonel J. H. McDonald, M.B., I.M.S. (retired). 1st November, 1926.

Lieutenant-Colonel J. W. Watson, C.I.E., I.M.S., Civil Surgeon, Ajmer and Chief Medical Officer in Rajputana held charge of the post of Additional Civil Surgeon, Ajmer, in addition to his own duties from 5th April, 1927 to the 22nd May, 1927, both days inclusive.

Major G. Covell, M.D., I.M.S., of the Medical Research Department is posted as supernumerary officer at the Central Research Institute, Kasauli, with effect from the 8th May, 1927.

Major H. E. Murray, M.B., I.M.S., is appointed as Second Resident Surgeon, Presidency General Hospital, with effect from the forenoon of the 30th April, 1927.

The services of Major L. H. Khan, I.M.S., are placed at the disposal of the Government of the Central Provinces, temporarily, for employment in the Jail Department, with effect from the date on which he assumes charge of his duties in that Department.

Major W. J. Simpson, I.M.S., Agency Surgeon in Bhopal, is appointed to officiate as Political Agent in Bhopal, in addition to his own duties, with effect from the 1st July, 1927, and until further orders.

LEAVE.

Colonel A. Fenton, M.B., I.M.S., Inspector-General of Civil Hospitals, Burma, is granted leave on average pay for 8 months, pending retirement, with effect from the 25th March, 1927.

Lieutenant-Colonel H. Hay Thorburn, C.I.E., I.M.S., an Agency Surgeon, is granted leave on average pay for 6 months under the Fundamental Rules, with effect from the 26th April, 1927.

Lieutenant-Colonel J. G. G. Swan, C.I.E., I.M.S., Civil Surgeon, Lahore, has been granted leave for 3 months, with effect from the 23rd June, 1927.

Major C. H. Smith, I.M.S., an Agency Surgeon, is granted leave on average pay for 8 months, combined with leave on half average pay for 4 months, under the Fundamental Rules, with effect from the 25th January, 1927.

PROMOTIONS.

Lieutenant-Colonel to be Colonel.

Cecil Charles Murison, F.R.C.S.E., *vice* Colonel Edmond Ludlow Perry, C.I.E., D.S.O., K.H.S., retired. Dated 24th June, 1927.

Captain to be Major.

Sorab Curshedji Contractor, M.B. Dated 14th July, 1927.

N. B. Mehta. Dated 21st June, 1927.

Lieutenant to be Captain.

E. G. Michelson, M.B. Dated 9th September, 1926.

RETIREMENTS.

Lieutenant-Colonel E. O. Thurston, M.B., F.R.C.S. 15th June, 1927.

Lieutenant-Colonel T. G. N. Stokes, M.B. 18th June, 1927.

NOTES.

SURGICAL INSTRUMENTS OF RUSTLESS STEEL.

WE have received from Messrs. Adair Dutt & Co., 5, Dalhousie Square, Calcutta, a copy of a very interesting catalogue of rustless surgical instruments manufactured by Fried. Krupp Aktiengesellschaft, Essen.

Rustless steel practically dates from 1909—1912 when the experiments of Strauss and Maurer at Essen showed the possibility of producing an iron alloy which would

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withstand rust. The new highly alloyed rustless steels, which have been largely introduced by Fried. Krupp, are much superior to nickel steel with regard to their ability to resist rust and all other corroding agents, in addition to which they possess great strength. There are several different types of such rustless steel manufactured for different purposes, such as for making machine parts, chisels and other steel instruments. Of these, it is claimed that the V2A rustless steel is of very exceptional quality for surgical instruments, and a large output of ordinary surgical instruments in such steel—scalpels, knives, scissors, lancets, forceps, clamps, hooks, sounds, spatulas, mirrors, spoons, curettes, retractors, bone instruments, etc.—is listed in the catalogue. It is claimed that these instruments are absolutely rust-proof and require no nickel-plating. They may safely be boiled in a bath of soda solution, and are not attacked by corrosive sublimate and the other ordinary disinfectants; they are much easier to keep in good condition than the ordinary nickel-plated variety of instrument, and their durability is almost unlimited. The ground edges and frictional surfaces remain rust-proof, which does away with the continuous and expensive necessity for re-nickeling. As far as practical surgery is concerned, the material is to all intents and purposes non-magnetic; whilst the metal affords a new type of non-glass mirror which can be repeatedly boiled or sterilised in a bactericidal solution without deterioration. For dental work V2A steel undergoes no change in the mouth and can be used as a substitute for rubber, porcelain, gold and platinum, and it provides an excellent and light material for dentures; a steel denture weighs but half as much as a gold one and is of greater strength.

A special feature of the reliance which the manufacturers place on the V2A steel is that their surgical scissors are fastened with a screw joint and are not made to take apart as are the ordinary nickel-plated scissors; in fact the tighter the screw joint, the better. They claim that the parts around the joint cannot rust, and with a screwed up pattern of scissors, halves of different pairs cannot be accidentally put together and the blades do not tend to work loose.

The catalogue is a very interesting one, for really rustless instruments would be a great boon in India. Messrs. Adair Dutt & Co., Calcutta, are the Indian agents.

WALDIE & CO.'S 1927-28 CATALOGUE.

MESSRS. D. WALDIE & CO., LTD., 1, British Indian Street, Calcutta, are one of the oldest and most celebrated wholesale chemical manufacturers and suppliers in India. They have a special department under European control dealing solely with general medical requirements of dispensaries and hospitals, and are large suppliers to the tea industry and other commercial concerns in India with big medical interests.

Waldie & Co.'s new catalogue for 1927-28 has recently been issued and will be of interest to all who require to order drugs on a large scale. The prices quoted are very low, and firms who run several hospitals or dispensaries would do well to consult the catalogue, which can be had free on request.

MILK AND MALARIA.

AT first sight there may not seem to be much connection between milk and the most common—if least dreaded—of Indian maladies. Indeed, most of the manuals of tropical diseases are silent on the subject, and we must turn to a well-known Indian book on children's diseases to find the relationship.

The writer says "It is most important in (malaria) cases that the diet should consist largely of milk. It is a remedy which possesses great value and one without which the child is not having a fair chance. An attempt should be made to induce a child of four or five years of age to consume 2 to 3 pints daily." (Birch's *Medical Treatment of Children in India*, 6th edition, p. 238.)

As we know, the malarial patient suffers a good deal from digestive troubles and though obviously in need of nourishment he often experiences difficulty in absorbing ordinary milk. Fluid diet, however, is often the only form of feeding which can be resorted to, as owing to the dryness of the mucous membrane of the mouth, caused by the pyrexia, mastication is rendered difficult or impossible. Recognising this clinical difficulty, Castellani suggests whey and albumen water (*Manual of Tropical Medicine*, p. 1197), but the amount of nutrition which these substances contain is slight, and a more nutritious food is obviously indicated.

Encouraged by the good results obtained from dried milk in enteric fever, many physicians in India and Burma have been led to use it in malarial cases, especially where gastric difficulties have supervened. The results have been most gratifying and open up a wide sphere of usefulness for the product.

The best known of the dried milks—Glaxo—seems adapted for use in malaria on account of its relatively low acidity as compared with the high acid content of wet Indian milk. Its high bacterial purity is also a recommendation of prime importance in that the patient's vitality is lowered and the mucous membranes prone to irritation. Moreover, it is very palatable and forms a welcome change to ordinary milk of which children and adults so quickly tire.

Flatulence, which is the bane of patients on milk diet, is altogether avoided by the use of Glaxo. But perhaps the most important point is that when gastro-intestinal disturbance exists, a considerable amount of the casein of ordinary milk is not digested. This throws a great deal of increased work on the kidneys which are already embarrassed by the general constitutional disturbance. The use of dried milk avoids this difficulty, as the protein in the process of drying has undergone a change which renders it much more easily assimilable and the strain on the kidneys is thus eliminated.

We are inclined to agree with the editor of Birch's Manual and to suggest that not only in the case of children, but in adults as well, the malarial patient who does not receive a liberal allowance of waterless milk, is not having "a fair chance."

Publishers' Notice.

SCIENTIFIC Articles and Notes of interest to the profession in India are solicited. Contributors of Original Articles will receive 25 reprints *gratis*, if asked for at the time of submitting their manuscripts.

Communications on Editorial Matters, Articles, Letters and Books for Review should be addressed to THE EDITOR, *The Indian Medical Gazette*, c/o The Calcutta School of Tropical Medicine, Central Avenue, Calcutta.

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Original Articles.

SOME OBSERVATIONS ON GASTRIC AND DUODENAL ULCERS IN BENGAL.

By H. HINGSTON, M.D.,

MAJOR, I.M.S.,

Surgeon to His Excellency the Governor of Bengal.

THE statistical records of the various hospitals in India show great variations in the incidence of ulcers of the stomach and duodenum in the different parts of this country.

I have obtained the following figures from the superintendents of the hospitals mentioned, and must here thank those officers for so kindly supplying me with the statistics.

TABLE I.

Statistics of the Madras General Hospital.

(1) Admissions to the surgical wards, which underwent operation.

Year.	Gastric ulcer and Malignant stomach.	Duodenal ulcer.	Total.
1918	....	not classified	8
1919	....	do.	6
1920	....	do.	9
1921	....	do.	12
1922	....	do.	132
1923	23 (3)	230	253
1924	24	210	234
1925	76	189	265
1926	33 (12)	227	260

Figures in brackets are those of malignant disease; not available for other years.

(2) In addition to the figures shown above, the following cases of gastric and duodenal ulcer were admitted to the surgical wards, but were not operated on for various reasons.

1922	..	61
1923	..	40
1924	..	73
1925	..	130
1926	..	131

(3) Admissions to the medical wards.

Year.	Gastric ulcer.	Malignant stomach	Duodenal ulcer.	Total.
1922	9	2	1	12
1923	8	2	3	13
1924	21	3	0	24
1925	30	3	4	37
1926	23	8	0	31

Summary of the Madras statistics.

(1) The number of gastric operations has increased from 8 in 1918 to 260 in 1926.

(2) The total of all admissions for these ulcers has increased from 205 in 1922 to 422 in 1926.

(3) There was a sudden increase in gastric operations from 12 in 1921 to 132 in 1922.

(4) All duodenal ulcers are admitted to the surgical wards and two out of three undergo operation.

Statistics of the Medical College Hospital, Calcutta.

Date.	CASES ADMITTED TO THE SURGICAL WARDS.			Operations performed.
	Gastric Ulcer and Malignant stomach.	Duodenal Ulcer.	Total.	
1920	1	5	6	2
1921	4	0	4	4
1922	4	2	6	4
1923	2	2	4	4
1924	6	2	8	8
1925	13	10	23	13
1926	20	10	30	15

The number of cases admitted to the medical wards (combined figures).

1920	..	10
1921	..	9
1922	..	13
1923	..	21
1924	..	12
1925	..	20
1926	..	37

The General Hospital, Rangoon.

Total number admitted (combined figures).

1923	..	14
1924	..	12
1925	..	16
1926	..	23

The Mayo Hospital, Lahore.

The total number of cases treated during the past six years (admitted to hospital).

Gastric ulcers	..	11
Duodenal ulcers		3

It will immediately be apparent that, as far as these statistics show, these ulcers seem to be of far more frequent occurrence in Southern India than in other parts, or if we consider two definite areas, much more common in Madras than in Bengal.

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But statistics do not always prove what at first sight appears to be undeniable. This is true of all medical statistics, and more particularly so of a comparative statement compiled from different sources, such as the above. There are many fallacies which must be taken into consideration. It is not necessary for me to dilate on all of these, but there is one which is of great importance. I refer to that fallacy which arises in such statistics from the differences in opinion, skill, and outlook of the various compilers. Differences in opinion and skill are obvious, but what I have termed outlook needs some explanation.

I think that the statistics of the Madras General Hospital in relation to peptic ulcers for the last few years will explain what I mean.

It would appear that the incidence of the disease has enormously increased in Madras in recent years, and further, if we compare these statistics with those of the Medical College, Calcutta, it would seem that the disease is many times more prevalent in Madras than in Calcutta.

I do not believe that either of these statements is true. I think that the great increase and the comparative predominance of the disease in Madras, as compared with Calcutta, are due to the outlook of the physicians and surgeons of the former city.

In Madras gastric and duodenal ulcers are considered to be serious diseases, as undoubtedly they are. The majority seem to be treated by surgical methods, apparently with great success, as the statistics show.

A year ago I formed the opinion that in the Medical College, Calcutta, this was not so. Most of these cases were treated as out-patients, and those that were admitted were treated in the medical wards. The majority of cases coming to the Medical College were in an advanced stage. It is manifestly impossible to treat such cases as out-patients, and it is extremely doubtful if they can be cured by any medical means.

There is, therefore, in the Madras Presidency a centre in which the treatment of these cases forms a most important part of the surgical work. This is a condition which leads the students, the local practitioners, and the cured patients themselves to realise the importance of the disease and the efficiency of the treatment. Such a condition will undoubtedly increase the number of patients coming to the hospital. The students will learn the methods of diagnosis, and the younger school of practitioners will learn that the methods of treatment available in the districts are inferior to those practised in the hospital.

It is quite different in Bengal. I could not help forming the opinion that the disease was common in Calcutta, but that the local doctors did not realise its importance, that they did not realise the many methods of diagnosis available, and above all that they considered a method of treatment by drugs with a modified diet to be an adequate measure, except in cases with gross complications.

In the mofussil, I came to the conclusion that the disease was very prevalent among the better classes, and that it was seldom diagnosed before the onset of a hæmatemesis or marked melæna.

In private practice I have seen more of this disease than I have of any other, with the exception of tuberculosis of the lungs.

It is owing to the above considerations that I have been prompted to write this paper, that it may in some measure help those practitioners who, from the exigencies of their service, are now in the position that we all were before the work of Moynihan and others greatly simplified the diagnosis of peptic ulcers. It is not so many years ago since the clinical pictures of the various indigestions were shrouded in a fog of obscurity. I think that I may confidently state that from this fog the picture of the symptoms of peptic ulcer has so emerged that now an ulcer of the stomach or duodenum, that has reached a certain stage, can be diagnosed with more certainty than any other chronic abdominal disorder. If this is so, we should all have a very clear idea of the means and methods by which this confident diagnosis may be made.

Before discussing these methods it is desirable that we should have some idea of the incidence of the disease.

In Bengal I think it is much more common in men than in women, although I am aware that one sees many more male than female patients in the day's work. A very noticeable fact is that it appears to occur much more frequently in those persons of the better class who are well educated and lead more or less sedentary lives. In the small series of cases tabulated, all the patients, with one exception (the *ayah*), were educated and could speak English. Further, before discussing symptons, I must mention a fact that greatly simplifies diagnosis in Bengal; that is the great rarity of cancer of the stomach. I have diagnosed cancer with confidence on three occasions. The diagnosis in each case rested on the age of the patient, the state of emaciation, supported by *x*-ray examination, and more particularly the achlorhydria shown by the test meal. Two of these cases came to the *post-mortem* table and in both the diagnosis was wrong, for the ulcers, though extensive, were simple.

In the diagnosis of all diseases the methods at our disposal may be divided into two great classes. The first class comprises the history of the case and the ordinary clinical examination. The second class involves the use of more or less complicated pathological, physical and chemical examinations.

In the diagnosis of peptic ulcers both classes of methods are of great value. Although the second class has received great prominence, I am of opinion that the ordinary clinical examination, and more particularly the history, is the safest basis on which to found our diagnosis. I should like to lay particular stress on this, for on several occasions I have been told by district medical officers that they are not able to diagnose

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these cases without complicated examinations, which are not available.

This is entirely wrong, at any rate so far as Bengal is concerned. The patients do not come to the better class of *mofussil* practitioner or to the hospitals until the disease is considerably advanced. A study of the table of cases will show that in extremely few was the radiological or the pathological examination really necessary. In fact I think that a surgeon who considered surgery to be the only cure for these cases would have been justified in opening the abdomen on the clinical history alone. Of course I do not mean that modern methods are not of the greatest importance in diagnosing early cases. Such a statement would be absurd. But I wish to emphasise the fact that not one of these patients of a superior class, who had all shown symptoms pointing to one probable conclusion, had ever been told that he might have an ulcer until he came to the out-patient department of the Medical College Hospital.

I shall, therefore, first attempt to emphasise those points in the history which I have found to be of great significance.

(1) *First, last* and *always* is the presence of *pain*. This is, in almost every case, the chief burden of the patient's complaint. Whatever other points in the history are elicited they are all overshadowed by the *pain*. This pain is definite. The patient will resolutely deny that it is merely a feeling of discomfort or distension or of flatulence. Patients describe the character of the pain differently, although in all cases there is a family resemblance.

Generally it is described as starting above the navel and passing upwards and backwards. The patient can always indicate the point of maximum intensity with his finger, and this is usually found to be just to the right of the middle line (sometimes the left) and midway between the navel and the sternum.

The character of the pain is variously described as grinding or burning or boring. The description of the pain never gives the listener the impression that it was caused by one of the colics or by a hepatitis, for its character, onset and duration are quite different.

The onset is never dramatic. In fact in most cases a careful questioning will elicit the fact that the severe pain has been gradually superimposed on a state in which the chief symptoms were abdominal discomfort, acid eructations, and occasional slight burning pain behind the sternum; in short, the symptoms of hyperacidity.

The time of occurrence of this pain is often very typical, and I think in Bengali patients more frequently approaches the classical description than in Europeans. The patient with a duodenal ulcer, which is the most common, describes his pain as coming on in the afternoon or at night; that it lasts for some hours and is relieved by taking food or water. The pain occurs in the more or less empty stomach and disappears when the emptiness is relieved.

The patient with a gastric ulcer complains of the pain shortly after food; it is not relieved by more food but is relieved by vomiting, which is frequent.

The history is so important that I shall here give two which are typical of many as described in the patient's own words.

D. G., *æt*, 35. Clerk.

"During 1925 I was a business man at Pabna and used to get my meals very irregularly. I then began to get occasional pain which was a kind of pinching. It started near the navel and spread upwards. The pain came every afternoon and subsided after 2 or 3 hours. I had great relief when I belched, and I used to bring up acid fluid. In 1926 I went to Rajshahi and the pain became much worse but the belching stopped. The pain was very regular. It was so bad at night that I thought of committing suicide. It got better when I took milk and also when I applied pressure with my finger or with a pillow. I had *kaviraj* treatment and emetine injections with no benefit."

This second history was written by a 6th year medical student in his own words.

N. M., Medical student, *æt*, 25.

"A year ago I had bad stomatitis and a persistent sore throat. It was cured in about a month. A month after this I went to a dinner and felt a burning sensation after taking overspiced curry. Eight months ago I noticed hyperacidity and heartburn. Six months ago I first noticed epigastric pain. The pain was localised over a small round area just below the xyphoid process and to the left of the middle line. The pain was so intense that it wakened me at night, and it was relieved by taking water or some food. It generally came on in the acute form at night but persisted in a slight form during the day, being worse in the afternoon.

I went to Dr. G. He found the liver slightly enlarged and prescribed a course of emetine injections. He also gave me a powder containing bismuth carbonate and sodium bicarbonate, and regulated my diet. After taking the powder I felt much better and thought that I was cured, but a week ago the pain returned and I came to hospital.

It will be noticed that vomiting is not mentioned. This is a rare symptom in duodenal ulcers, except in advanced cases with obstruction. Some patients have suffered from indigestion with vomiting previous to the onset of the pain, and others have found that they can relieve the pain by inducing vomiting with the finger. The latter point is of interest as I think it indicates that this causes a regurgitation of the alkaline contents of the duodenum and thus relieves the pain. Retching a few times is usually as successful as vomiting. In cases of long duration there are often periods of almost complete relief, but the symptoms once established almost invariably recur.

(2) The majority of cases whose symptoms have lasted more than a few months have passed black stools on one or more occasions (melæna). It is remarkable that the patient never volunteers this information. A direct question is almost always necessary, but then there is no doubt, and often he remembers that at that time he felt very weak and stayed in bed for a few days. Melæna seems to be of very little significance to the Bengali patient.

Having obtained the history, the next step is the physical examination. There is nothing

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dramatic in this. The patient is seldom remarkably wasted or anæmic. In fact, his condition is usually much better than one would expect from the long history of pain and indigestion.

By far the most important signs are found by carefully examining the area where the patient indicates that the pain is most severe. It is very seldom indeed that I have felt a definite lump, but there are other signs.

(3) A slight rigidity of the rectus and tenderness on deep pressure are almost universal in advanced cases, and in many there is definite hyperæsthesia on pinching the skin and on slight pricking with a needle. I think that this indicates involvement of the peritoneum, and probably adhesions, and therefore is of surgical importance as indicating possibly a more difficult operation.

I have not been able to find any chronic infection in Bengali patients which indicated a general causative factor of these ulcers. Pyorrhœa alveolaris is not more common in these than in other patients. Previous intestinal infections are not often related, and syphilis in a series of 20 cases was less than one would expect (one positive Wassermann reaction only). But it is most important that in the clinical examination these should be looked for, always remembering amœbiasis and intestinal worms. If the history or examination indicates syphilis, a Wassermann reaction must be done, as such a case will show no improvement without specific treatment.

I do not wish to describe in any detail all the physical and pathological examinations that may be done, but in order to complete the story I must mention the routine carried out by me in the Medical College Hospital and the results obtained.

The following examinations were done.

(*a*) Dental examination and treatment by the dental surgeon.

(*b*) Examination of the stools for parasites and occult blood.

(*c*) The Wassermann reaction.

(*d*) Radiological examination with the barium meal.

(*e*) The acidity curve by the fractional test meal.

(4) I was surprised to find that the occult blood test was negative in several definite cases which previously had melæna. They were all cases of long duration. I have a suspicion that many of these ulcers tend to heal on the mucous surface and become cicatricized, while the inflammation continues and even spreads in the muscular coats and on the peritoneal surface. However this may be, a negative occult blood test is not of much importance.

(5) Radiological examination is of course of great importance, and in doubtful cases may clinch the diagnosis. In hospital work a large series of films is not practicable. Three films of each case were taken; one shortly after the meal, one at 6 hours, and one at 24 hours. As most of the cases were advanced, retention of the meal and the demonstration of ulcer craters were more common than is usually seen in European practice.

The screen report of the radiologist is invaluable, and much more important in most cases than the actual photographs. I should like to emphasise this point, for there are many persons in the cities of India who will produce quite good photographs taken at definite intervals, and consider that this is sufficient for the clinician to make a diagnosis on. This is not so. The skilled radiologist who can describe what he sees is the invaluable man, and if he can take the photographs at the correct moment, so much the better. There are not many up-to-date *x*-ray plants in India, and still fewer expert radiologists, so that this method of investigation is very limited throughout the country.

(6) The fractional test meal in most cases gave results which are considered typical. In the duodenal ulcer cases high and sustained acidity, and in the gastric ulcers a more or less normal curve. This investigation is not of much real service. Probably its chief value is to demonstrate the absence of free HCl so common in cancer of the stomach, and as before mentioned, this can almost be neglected in Bengal.

Methods and results of medical treatment.

Before discussing the methods of medical treatment I shall make some attempt to state what we know of the causation of these ulcers, the reasons why they produce their peculiar symptoms, and therefore the principles that underly these methods.

The exact reason why an ulcer should start in the stomach or duodenum is not known. It is extremely difficult to produce such ulcers in animals, and the most successful method has been that of feeding them with food grossly contaminated with *B. coli*.

Infection coming from the mouth probably plays a part. A small acute ulcer first forms; this enlarges from thrombosis of the neighbouring vessels and from digestion by the gastric juice. Hyperacidity probably helps to continue, but not primarily to cause the ulcer. The ulcer then deepens, involving the muscular coats and the peritoneal surface, causing perforation or adhesions to neighbouring organs. The mucous surface tends to heal and cicatricize, but fresh ulcers tend to form on the edge of the crater, and multiple ulcers are common. A last stage may be complete obstruction from contraction of the scar of the ulcer, but I think that this is of rare occurrence. A much more common condition is a more or less spasmodic obstruction at the site of the ulcer. I have seen two cases in which this spasmodic condition was so severe that it entirely simulated an organic obstruction. One case indeed died primarily from obstruction, although at *post-mortem* the pylorus easily admitted a finger.

It is rather difficult to understand why the pathological conditions cause the typical symptoms

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that they do, and this is more particularly the case with duodenal ulcers.

What is the cause of the pain?

It is not due to the mere mechanical irritation of the acid gastric juice on the ulcerated mucous membrane. *Post-mortem* it is not uncommon to see ulcers which, although superficially large, are not indurated and have never caused symptoms. Occasionally a rapidly penetrating duodenal ulcer will perforate, and this calamity will be the first indication that anything is wrong. Also I have given patients acid liquids, and this does not seem to bring on the pain more quickly in gastric, or more severely in duodenal ulcers. That the presence of hyperacidity in duodenal ulcers is a proof that the acid causes the pain is a fallacious argument; for although acid *may* cause spasm of the pylorus and therefore pain, it is quite certain that spasm of the pylorus from any other cau will cause hyperacidity. The physiological neutralisation of the gastric juice is carried out by the regurgitation of the alkaline contents of the duodenum. The chief reason that we have for believing that the acidity causes the pain is the effect of alkalies, which in most cases immediately relieve it. I believe that the pain is entirely caused by a spasm of the stomach immediately proximal to the ulcer, and that this spasm does not occur until the ulcer has invaded the muscle and has caused induration. This spasm is of a protective nature and is in some way related to the gastric juice. It therefore follows that I consider that when the typical symptoms have appeared the ulcer is already chronic, deep, and possibly callous.

Holding this opinion has influenced my views regarding the medical treatment of these ulcers, although speaking as a physician, I do not think that any medical treatment will permanently cure even a small minority of these advanced cases as seen in Bengal. Any medical treatment to be efficient must be complicated and carried out over a long period, and then even in early cases an apparent cure is hailed with delight. Of the several cases that I have treated I only know of two that I can consider to be cured after three years. They are both Europeans, were early cases, and the treatment extended over many months.

But if the treatment does not often cure, it always gives rapid and often dramatic relief from the symptoms. This relief is so great that the patient in a few days will scorn the idea of a surgical operation. He is more pleased with himself than any other patient in the ward, and will remain in hospital for a long time. Alas! Perhaps after some months, when the diet has been increased and the medicines reduced, there is some return of the symptoms and the physician knows that he is not cured. I feel so strongly about this that I consider that any patient who has had symptoms for a considerable time should be admitted directly to the surgical wards and should receive no medical treatment before the operation.

Still there must be many cases which for various reasons cannot undergo surgical operations. It is for the relief of these that I wish to describe the medical treatment.

Primarily the mouth and teeth should be attended to, and any intestinal infection treated.

The two chief medical methods at present in vogue are those of Lenhartz and Sippy. The former essentially consists in giving a diet of adequate caloric value from the first, containing a large amount of protein, especially raw eggs, all feeds being iced. This is certainly not suitable for Bengali patients and I have never used it.

The latter has for its main object the protection of the ulcer from HCl. It is essential that the patient should remain in bed for at least two weeks and should be carefully nursed. He must receive very frequent feeds and, in the original method, as described by Sippy, he is given belladonna before each feed and an alkaline mixture after each feed.

There have been many modifications of this method, and the modification that I have used is shown in Table IV. This was drawn up for me from various sources by Dr. C. Mitra at the Presidency General Hospital in 1924, and is, I believe, still being used there. At first sight the table appears to be very complicated. It is not really so, for it will be noticed that it is merely a repetition throughout the day. An intelligent patient can soon learn to treat himself if the food and powders are provided. It is essentially drawn up for European patients, but by substituting rice for bread and butter, and fish for eggs, it can be adapted for Bengalis. Still it is a rigorous règime and does require a great deal of attention from the attendants. In early cases, where there may be some hope of a permanent cure, or as a method of treatment after a hæmatemesis or melæna, it is essential, and lately I have reserved it for the few of these types that I have seen.

I sought for a simpler method that would give the same relief from the symptoms, and after some trials, with the help of Dr. Chakravarti of the Medical College Hospital, came to the conclusion that the method shown in Table V was as good as any.

It will be noticed that the feeds (which need not be citrated or iced) are given two hourly, and that belladonna or olive oil is given before each meal and a simple powder after each meal. At night 4 ozs. of milk, followed by a powder are given if there is any pain.

The relief obtained is immediate, and frequently in 36 hours the pain has disappeared entirely. The patient should remain in bed until there has been no pain for four days and tenderness on deep pressure has almost gone. This occurs usually in about twelve days and then

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TABLE II.

Cases of Gastric Ulcer.

Admission.	Sex and caste.	Age.	Duration.	Occupation.	Summary of chief complaints.	Summary of Radiologist's diagnosis (R. D.)	Fractional test meal.	Date of discharge.	Gain in weight. lbs.	REMARKS.
26-1-26 ..	H. M.	36	3	Pleader.	Pain half an hour after food, relieved by vomiting which was frequent. Melæna on two occasions. No hæmatemesis.	Filling defect at posterior-internal aspect of pylorus. 6 hours—residue seen in this position. R. D. Pyloric ulcer.	Not done.	5-5-26.	7	Nil.
20-2-26 ..	H. M.	30	6|12	Telephone Inspector.	Continual pain which is much worse immediately after food. Vomiting is frequent and relieves the pain. Pain is increased by moving about. No melæna or hæmatemesis.	Marked filling defect at lesser curvature. 6 hours—a filled ulcer crater at pylorus. R. D. Pyloric ulcer at postero-mesial aspect.	No marked hyperacidity.	19-3-26.	Nil.	Nil.
		Doubtful	Cases	(considered	negative).	Doubtful cases.				
9-2-26 ..	H. M.	27	5	Nil.	General discomfort after food and occasional vomiting. Heartburn and pain of a burning character behind the sternum. No melæna or hæmatemesis.	Peristalsis irregular at pylorus. Flattening of duodenal cap. 6 hours—no residue. R. D. No evidence of ulcer, but irritability points to some hyperacidity.	A marked rise in total acidity and free HCl up to 1½ hours when patient vomited the tube.	10-3-26.	Nil.	Apparently a case of simple hyperchlorhydria.
17-2-26 ..	H. M.	25	6|12	Clerk	Onset sudden pain 6 months ago, since then general discomfort after food but no further severe pain. Loss of weight. No melæna or hæmatemesis.	No signs of ulcer. Some signs of duodenal irritability.	Very indefinite.	16-4-26.	18	Nothing points towards an ulcer.

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TABLE III.
Cases of Duodenal Ulcer.

Admission.	Sex and caste.	Age.	Duration.	Occupation.	Summary of chief complaints.	Summary of Radiologist's diagnosis (R. D.)	Fractional test meal.	Date of discharge.	Gain in weight. lbs.	REMARKS.
20-5-26 ..	H. M.	33	4 years.	Clerk.	Pain 3—4 hours after food, worse at night. Relieved by food. Flatulence, occasional vomiting, melæna 3 or 4 times.	Duodenal cap filled with difficulty and is markedly irregular. One patch on mesial aspect shows marked residue on palpation. 6 hours—residue. R. D. Duodenal ulcer on posterior mesial aspect of first part.	Hyperacidity.	28-8-26.	15½	Nil.
19-6-26 ..	H. M.	40	3 years.	Engineer.	Pain 3—4 hours after food, relieved by food and eructations, worse at night; no vomiting, melæna once.	Duodenal cap is irregular. 6 hours no residue. R. D. there is no definite evidence of duodenal ulcer although there is some evidence.	Hyperacidity.	1-7-26.	Nil.	Clinical history clinches the diagnosis.
24-8-26 ..	H. M.	25	6|12	Medical student.	Hyperacidity, heartburn. Pain, at first waking him at night. Relieved by food, water or alkalies. No vomiting or melæna.	Pylorus and duodenum show irritability and peristalsis is plus here. Duodenal cap fills irregularly and a defect is seen on the post-mesial aspect. A residue is seen here on emptying. 6 hours—a residue seen in pylorus and duodenum. R. D. Duodenal ulcer.	A low acid content up to 1½ hours then rapid rise and high at 2½ hours.	5-9-26.	Nil.	Went home to continue treatment.
30-5-26 ..	M. M.	35	3	Nil.	Pain 3—4 hours after food, at first only at night, later during day also. Relieved by vomiting or more food. Melæna 2—3 times. Hæmatemesis once.	Duodenal cap seems to be ptosed behind the pylorus and can be made to emerge by palpation, when its superior edge is flattened. 6 hours—residue in stomach. R. D. No definite evidence of ulcer. Duodenal kink.	A rising curve up to 2½ hours.	27-9-26.	19	Clinical history definite, but radiology not so.
6-2-26 ..	H. F.	40	5	Ayah.	Pain some hours after food. Worse at night. Seldom vomits. Melæna once.	Peristalsis very irregular at the pylorus. Duodenal cap fills with a marked defect at the post-mesial aspect. 6 hours—duodenal ulcer crater seen. R. D. Duodenal ulcer.	Marked rise in total acidity and free HCl at 2½ hours.	10-3-26.	'I!N	Nil.
2-3-26 ..	E. F.	38	3|12	Nurse.	Pain 3 hours after food, worse at night, relieved by food. Loss of weight, occasional vomiting of acid fluid. No melæna.	Pylorus markedly irregular and here peristalsis is irritable. Duodenal cap fills with a marked defect on the post-mesial aspect. 6 hours—marked residue. R. D. Duodenal ulcer on post-mesial aspect of terminal part of first part.	Typical chart of hyperacidity.	1-5-26.	9	Later underwent operation for ovarian tumour, when diagnosis was confirmed.

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TABLE III—(*Continued*).

Cases of Duodenal Ulcer.

Admission.	Sex and caste.	Age.	Duration.	Occupation.	Summary of chief complaints.	Summary of Radiologist's diagnosis (R. D.)	Fractional test meal.	Date of discharge.	Gain in weight. lbs.	REMARKS.
2-3-26 ..	H. M.	45	5	Nil.	Dyspepsia and acidity 5 years. During last year marked pain 3—4 hours after food, worse at night, relieved by food and by vomiting. Melæna one month ago.	Peristalsis at pylorus is irritable. Persistent filling defect seen. 6 hours—residue. 24 hours—residue. Duodenal cap is very irregular. R. D. Duodenal and pyloric ulcers.	Marked hyperacidity up to 1½ hours; then patient retched and hyperacidity disappeared.	3-5-26.	14	Nil.
23-6-26 ..	A. I. M.	33	6|12	Fitter.	Heartburn, acid eructations. Pain 2—3 hours after food, relieved by food and vomiting.	Duodenal cap fills irregularly. Residue seen after it empties each time. 6 hours—residue apparently in duodenum. R. D. Duodenal ulcer.	Hyperacidity.	In hospital.	18½	Nil.
29-7-26 ..	A. I. M.	36	3	Engine driver.	History indefinite, but chiefly pain not related to food, but relieved by vomiting self induced. No melæna.	Stomach hypotonic. Duodenal cap markedly irregular especially mesial aspect. Fills with difficulty there appearing to be some obstruction at the pylorus. 6 hours—residue in pylorus and duodenum. R. D. Ulcer first part of duodenum and also possibly pylorus.	Indefinite, but some hyperacidity.	In hospital.	7¼	Diagnosis decided by radiology. Otherwise doubtful.
19-7-26 ..	H. M.	35	6|12	Clerk.	Pain before food; at first not severe but lately very severe at night. Vomited 4 times, melæna once.	Peristalsis vigorous. Duodenal cap deformed and definite filling defect seen on mesial aspect. 6 hours—residue in duodenum (ulcer crater) beautifully shown. R. D. Ulcer mesial aspect, first part of duodenum.	Vomited tube after 1½ hours, but HCl plus.	1-11-26.	13	Nil.
9-8-26 ..	H. M.	28	3	Nil.	Pain 2—3 hours after food, very severe at night and much worse during the last year. Relieved by food. Melæna several times.	Peristalsis brisk. Duodenal cap seen to fill with a defect on the post-internal surface. 6 hours—residue seen in duodenum. R. D. Duodenal ulcer.	Some hyperacidity.	In hospital.	14	Nil.
27-9-26 ..	H. M.	21	1	Shopkeeper.	Long history of indigestion and acidity. For one year pain shortly after food, lasting for 2—3 hours and relieved by vomiting. Not relieved by food. Only occasionally at night. Melæna twice.	Peristalsis regular but irritable at pylorus. Duodenal cap deformed and does not fill well. 6 hours—small residue in duodenum, most of meal in ileum. 24 hours—head of meal at sigmoid, some still in ileum. R. D. Duodenal ulcer and ileal stasis.	Acidity normal.	In hospital.	4¼	One of the few cases in which there was not hyperacidity.

N.B.—All patients whose occupation is shown as nil, were educated.
(1) Persons who were not able to work owing to illness.
(2) "In hospital" means November 1926 when observations ceased.

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TABLE IV.

Feeding for Gastro-Duodenal Ulcer Case.

(After Osler & Price.)

Time.	1st week.	2nd week.	3rd week.	4th week.	3rd Fortnight.	4th Fortnight.
		Add.	Add.	Add.	Add.	
6-30 a.m.	Olive oil—oz. i.				Olive oil—oz. i.	Olive oil—oz. i.
7 „	Milk Tea (cit.) —ozs. iii.	1 slice bread and butter.		2 slices bread and butter.	2 slices bread and butter; 1 banana.	Cit. Milk Tea—ozs. vi; 3 slices bread and butter; banana 1; eggs 2.
7-30 „	Pulv. Mag. Carb.					
8 „	Cit. Milk—ozs. iii. Enema P.R.N.				Cit. Milk—ozs. iii.	Pulv. Mag. Carb.
8-30 „	Pulv. Bis. Carb.					
9 „	Cit. Milk—ozs. iii.		1 slice bread and butter 1 egg (soft).		Cit. Milk—ozs. iii. Banana 1, Eggs 2, 2 slices bread and butter	Cit. Milk—ozs. vi. Glucose—dram i.
9-30 „	Pulv. Mag. Carb.					
10 „	Cit. Milk—ozs. iii.	1 slice bread and butter.			Cit. Milk—ozs. iii.	Pulv. Bis. Carb.
10-30 „	Pulv. Bis. Carb.					
11 „	Cit. Milk—ozs. iii.		1 slice bread and butter.		Cit. Milk—ozs. iii. 1 banana; 2 slices bread and butter.	Cit. Milk—ozs. vi. Bread and butter—3 slices; Banana 1; Fish ozs. iv.
Noon	Pulv. Mag. Carb.					
1 p.m.	Cit. Milk—ozs. iii.				Cit. Milk—ozs. iii.	Pulv. Mag. Carb.
2 „	Pulv. Bis. Carb.				Cit. Milk—ozs. vi. 3 slices bread and butter; 1 Pudding; Glucose—dram. i.	
3 „	Cit. Milk—ozs. iii.		1 pudding.	2 slices bread and butter.	2 slices bread and butter; 1 pudding.	Pulv. Bis. Carb.
3-30 „	Pulv. Mag. Carb.					
4 „	Cit. Milk Tea—ozs. iii.				Cit. Milk Tea—ozs. iii.	Cit. Milk Tea—ozs. vi.
4-30 „	Pulv. Bis. Carb.					
5 „	Cit. Milk—ozs. iii.				Cit. Milk—ozs. iii.	Pulv. Mag. Carb.
5-30 „	Pulv. Mag. Carb.					
6 „	Cit. Milk Tea—ozs. iii.				Cit. Milk Tea—ozs. iii.	Cit. Milk Tea—ozs. vi; 3 slices bread and butter; 1 banana; 1 sponge finger.
6-30 „	Pulv. Bis. Carb.					
7 „	Cit. Milk Tea—ozs. iii.	1 slice bread and butter.	2slices bread and butter.	1 pudding.	Cit. Milk Tea—ozs. iii. 2 slices bread and butter; 1 pudding.	Pulv. Bis. Carb. Olive oil—oz. i.
7-30 „	Pulv. Mag. Carb.					
8 „	Cit. Milk Tea—ozs. iii.		Olive oil—oz. i P.R.N.		Cit. Milk Tea—ozs. iii.	Cit. Milk—ozs. vi. 1 pudding. Glucose—dram. i.
8-30 „	Pulv. Bis. Carb.					Pulv. Mag. Carb.
10 „	Inj. Atropine Sulph (gr. $\frac{1}{100}$ (Subcut.				Stop Inj. Atropine if not S.O.S.	1 Cup Cit. Milk—ozs. vi during night.

N.B.—Glucose 3 per cent. in each feed till end of 3rd fortnight. Each Pulv. given in Aqua ozs. ii. Stomach wash with Lot. Sod. Bicarb S.O.S. Barley water during night.

5th Fortnight.—Treatment as in 4th, but only 4 powders alternately as A.C. 2 p.m. Chicken Quenelles and Potato Cream instead of milk.

6th Fortnight—Ordinary Meal Times.—Treatment as in 5th; but add 10-30 a.m. (breakfast) Porridge; Tea 2 p.m. (tiffin) as before; 4 p.m. (Tea) Tea, bread and butter, sponge cake, (supper or dinner) 2 eggs.

PULV. MAG. CARB.

Mag. Carb. Pond.	..	gr. x.
Sod. Bicarb ..	..	gr. xv.

PULV. BIS. CARB.

Bis. Carb. ..	..	gr. x.
Sod. Bicarb ..	..	gr. xv.

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TABLE V.

Modified Sippy Treatment.

Time.	Before food.	Diet.	Half an hour after food.
8 a.m.	Olive oil—½ oz.	Milk—6 ozs.	Sodi Bicarb—gr. x. Magnesia Pond—gr. x. in Aqua—ii ozs.
10 a.m.	Tr. Belladonna—mv. Aqua—1 oz.	Milk—6 ozs.	Bismuth Carb—gr. x. Sodi Bicarb—gr. x. in Aqua—ii ozs.
12 Noon	Olive oil—½ oz.	Milk—6 ozs.	Sodi Bicarb powder in Aqua—ii ozs.
2 p.m.	Tr. Belladonna—mv. Aqua—1 oz.	Milk—6 ozs.	Bismuth Carb. powder in Aqua—ii ozs.
4 p.m.	Olive oil—½ oz.	Milk—6 ozs.	Sodi Bicarb powder in Aqua—ii ozs.
6 p.m.	Tr. Belladonna—mv. Aqua—1 oz.	Milk—6 ozs.	Bismuth Carb. powder in Aqua—ii ozs.
8 p.m.	Olive oil—½ oz.	Milk—6 ozs.	Sodi Bicarb powder in Aqua—ii ozs.
10 p.m.	Tr. Belladonna—mv. Aqua—1 oz.	Milk—6 ozs.	Bismuth Carb. etc. in Aqua—ii ozs.

Mouth to be washed with Sodi Bicarb lotion (iii½ dr. to 0i) before and after each feed.

comes the time to modify and increase the diet. This is not shown in the table as I think it is often necessary to modify the feeding according to the habits and likes of the patient. For instance an egg beaten up in 4 ozs. of milk instead of a 6-oz. feed would be the best commencement, but many patients will not eat eggs.

Also patients react differently, and any marked discomfort (apart from actual pain) is a sign to proceed cautiously. The usual procedure is first to substitute 2 ozs. of rice for 4 ozs. of milk in the 2nd and 6th feeds for a few days.

Then these feeds are made entirely of rice. Later there will be three rice feeds and one or two milk feeds will be stopped. Later still vegetables, fish, chicken and mutton may be slowly added and adapted in the three feeds, but a glass of milk is advisable first thing in the morning and last thing at night. During this time the belladonna and olive oil have been gradually stopped, but the powders must be continued after each meal.

Therefore the average patient at the end of about two months will be taking 1 oz. of olive oil and a glass of milk in the morning; three meals containing rice, vegetables, fish and meat suitably adapted during the day and a glass of milk at night. Each meal followed by a powder (one bismuth and two magnesia).

An important practical point must here be mentioned. In the Medical College Hospital, where at one time there were as many as 10 such patients in one ward, it was found impossible for the nursing staff adequately to deal with them. It must be remembered that they were all intelligent men and could read English. They were, therefore, allowed to a great extent to treat themselves. Each had a copy of the feed table, which he very quickly understood. Each had his own oil, powders, and belladonna mixture on his locker next his bed, and took them himself at the right time. Later, when the time came for cutting down the medicines and increasing the food, the modifications were carried out almost entirely on the advice of the patient himself.

He would find that there was some discomfort after missing a dose of belladonna or after taking fish. Next day he would take the belladonna or leave out the fish, and try again a few days later. All the patients understood that the treatment was progressive and that the medicines had to be gradually dispensed with. This may not seem a very scientific method, but in such cases where the progression depends entirely on the symptoms, it is eminently practical.

Up to this time I find that the patient has progressed well. He is very pleased with himself and usually has put on weight. One then considers the possibility of allowing him the usual two meals and to give up the powders. Here comes the difficulty, for in almost every case that I have seen the symptoms return and the patient is an invalid as before. This seems to be a confession of failure, but it is not entirely so. Several of my patients are, I believe, carrying on their occupations which are of a sedentary nature. They go to their offices with their powders in their pockets. They arrange their three meals a day and they sleep at night with the aid of another powder. They are free from severe pain and are happier than they have been for years, but they are not cured, and they know it well.

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Conclusions.

What conclusions can be drawn from these observations?

I think there are several.

The first is that the disease is quite common in Bengal, and yet for some reason is overlooked, left undiagnosed, and not efficiently treated. It appears to be more common in men of the sedentary classes.

The second is that there is no reason why the intelligent *mofussil* practitioner should not be able to diagnose these cases sooner or later from the symptoms and history alone, and yet this is seldom done.

The third is that medical treatment is extremely unsatisfactory. In its modern recognised form it is complicated, lengthy and expensive. I have found it to be quite impracticable. The simpler modification is efficient in so far as it gives as rapid and as great relief, but it very seldom cures.

Surgery seems to be the only hope, and I look forward to the time when gastric surgery in Bengal will approach and even eclipse that in Madras.

I wish to thank Lieut.-Col. F. A. F. Barnardo, I.M.S., Principal of the Medical College, for permission to publish these cases. The radiological work was done by Dr. Galstaun, the honorary radiologist to the hospital, and the pathological work in Major Shanks' laboratory. To the house physicians and to many students who spent many hours with syringes and Ryle's tubes, my thanks are also due.

INDIGENOUS CASES OF MALARIA AT HIGH ALTITUDES.

By M. V. PERUMAL, L.M.P.,

Resident Medical Officer, Lawley Hospital, Coonoor.

The old adage "Death is no respector of persons" may be modified and re-stated as "Malaria, the cause of a large percentage of mortality in the tropics, is no respector of persons." While this is admitted on all hands, yet there is a prevalent notion amongst medical men in India that at high altitudes malaria cannot spread. The purpose of this article is to dispel such a belief.

Coonoor is a hill station situated on ridges, with deep valleys in between. The lowest point of the valleys is over 5,500 feet, and the ridges over 6,000 feet above sea level. There is abundant water in the valleys, which are sheltered on all sides by the neighbouring ridges. The valleys are cultivated with ordinary garden produce, i.e., fruits, vegetables, etc. There is no wet cultivation. The town has a cool and salubrious climate for the greater part of the year. It is a health resort for Europeans and Indians alike, second only to Ootacamund, the seat of the Madras Government for the hot season. The different parts of the town are each situated on hills, so much so that they are named Gray's Hill, Tiger Hill, Mission Hill, Mount Pleasant, Dhoby Ghat, etc.

The following is an analysis of indigenous cases of malaria occurring in Coonoor, recorded from the middle of May 1927 onwards. Though the number is few, the conclusion may safely be come to that the cases were of truly indigenous origin; for the history of each case was carefully gone into, and the investigation was carried out under the able guidance of Lieutenant-Colonel A. S. Leslie, I.M.S.

Indeed the condition of affairs is a great menace to the growth and popularity of this town. From the following table we see that 50 per cent. of the cases are found in Dhoby Ghat, Coonoor, which is a part inhabited mostly by low classes of people and where sanitary principles are sadly neglected. This accounts for the continuous breeding of mosquitoes. Dhoby Ghat has an elevation of over 5,600 feet above sea level. There is a valley surrounded by ridges, the height of which is over 6,000 feet above sea level. A stream, fast running, crosses the valley in the middle, and on the slopes of the hills cabbages, potatoes and onions are cultivated. The least unbroken period of stay at Coonoor in the table is two years and this patient had had no fever before. In column 8 we notice that previous attacks of fever were present only in those patients who were born and bred in Coonoor and had never been to the plains.

The quartan type of parasite is noteworthy here by its absence. Whether the high altitude has an adverse effect on the spread of quartan malaria is doubtful. Malignant tertian parasites are responsible for the greatest number of cases.

The enlargement of the spleen may be noted in each case. When we remember that enlargement of the spleen is to be expected in all acute fevers, the basing on it of a clinical diagnosis of malaria should be made with diffidence. This emphasises the need for the supply of a microscope to each hospital and dispensary on Western lines in India. The scientific aids to diagnosis should not be neglected, especially so when good microscopes are now offered at rock-bottom prices. By these remarks, it is not in any way implied that the clinical aspect of medical training can afford to be neglected in its development.

In conclusion, I should like to express my thanks to Lieutenant-Colonel A. S. Leslie, I.M.S., Civil Surgeon, Coonoor, for valuable suggestions in the preparation of this note and for kind permission to publish it.

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TABLE I.

Serial Number.	Name.	Age.	Sex.	Nationality.	Residence.	Duration of stay at Coonoor unbroken.	History.		Spleen.	Result of microscopical examination.
							Previous.	Present.		
1	2	3	4	5	6	7	8	9	10	11
1.	Kuppan.	32	M.	O. C.	Dhoby Ghat, Coonoor.	* 12 years.	Nil.	First attack.	Just palpable and tender.	B. T. and M. T. mixed.
2.	Nagamony.	25	F.	H.	Mount Pleasant, Coonoor.	* From birth.	Nil.	First attack.	Just palpable and tender.	B. T. and M. T. mixed.
3.	Michael.	7	M. C.	O. C.	Dhoby Ghat, Coonoor.	* From birth.	An attack of fever one month before present attack.	Second attack.	2 fingers breadth below costal margin.	M. T.
4.	Muthu.	5	M. C.	O. C.	Dhoby Ghat, Coonoor.	* 3 years.	Nil.	First attack.	Just palpable and tender.	B. T. and M. T. mixed.
5.	Mari	11	M. C.	O. C.	Mount Pleasant, Coonoor.	* From birth.	Nil.	First attack lasting for a month.	2 fingers breadth below costal margin.	B. T. and M. T. mixed.
6.	Mariappan.	12	M.	H.	Dhoby Ghat, Coonoor.	* 2 years.	Nil.	First attack lasting for 4 days.	Just palpable and tender.	M. T.
7.	Anthoniammal.	30	F.	O. C.	Mount Pleasant, Coonoor.	* From birth in high altitudes.	Attacks of fever, probably malaria.	Pain in the splenic area.	Level of umbilicus.	M. T.
8.	Pedhan.	30	M.	H.	Dhoby Ghat, Coonoor.	* 15 years.	Nil.	First attack of fever lasting for a month.	2 fingers breadth below costal margin.	B. T.
9.	Yesu.	35	M.	O. C.	Alwarpet, Coonoor.	* From birth.	Nil.	First attack lasting for two months.	Just palpable and tender.	M. T.
10.	Veerappan.	36	M.	O. C.	D'Chamscherri.	* From birth.	Nil.	First attack.	Just palpable and tender.	B. T.

Remarks. * Never been off the Nilgiris, never been at any point lower than 5,500 feet above sea-level.

A NEW DILUENT FOR PARIS GREEN.

By P. A. DALAL, L.M. & S. (Bom.), D.T.M. & H. (Camb.),
and
E. E. MADON, L.M. & S. (Bom.),
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SINCE the publication of our paper on "Bombay Mill Ponds and Anopheline Control" in the *Indian Medical Gazette* of August 1926, our efforts have been directed towards the control of mosquitoe-breeding in the mill compounds. We propose in this paper to record a few points of general interest that have emerged during this enquiry.

Besides the large ponds or "lodges" referred to in the previous paper, the cotton mills in Bombay maintain a supply of water for fire purposes in big cisterns known as "sprinkler tanks," built on high towers, so that in case of fire the premises may be flooded by gravity flow through automatically-working pipe connections which are fitted overhead in the various departments. The number and size of the sprinkler tanks vary according to the requirements of each mill, but on an average each tank is from 30 feet to 60 feet either way, and carries permanently about 6 feet of water. The water is mostly a clean supply derived from the municipal mains, though an emergency connection with the mill-pond by means of a pump is also provided. Besides the sprinkler tanks, other cisterns, small and large, are also kept filled with clean water for various purposes. The majority of these cisterns are roofed over, but none of them seen by us so far are mosquitoe-proof, and malaria-carrying Anopheles are found breeding in some of them. Any measures devised to control such breeding will have a direct bearing on the general problems of malaria in Bombay city, as one of the most potent sources of Anopheles is the large number of household supply cisterns on the tops of Bombay houses. Of course the latter could

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be made harmless by simpler measures, but in practice very few are really mosquitoe-proof.

For dealing with the mill-cistern problem, "oiling," which had proved so effective in the case of the ponds had to be ruled out for obvious reasons, and some efficient substitute had to be found. In some basin-experiments in the laboratory, the insect-powders with a pyrethrum base that are on the market under different trade names were found to be fairly effective. Of the three brands tried, viz., Katol, Imazu, and Keating's powder, all were distinctly less effective against anopheline than against Culex and Stegomyia larvæ, and under working conditions in a small cistern where fresh water is replaced as the old supply is used up, they were ineffective in preventing anopheline larvæ from coming to maturity. None of them had any effect on the eggs, and very little on the pupæ.

The next substance to which attention was directed was Paris green. The question of finding a suitable diluent to suit our conditions was considered to be of some importance. It is believed that Paris green is a specific poison for anopheline larvæ and acts most probably by ingestion. The anopheline larva being a surface feeder, means have to be devised to keep the particles of the drug floating on the surface. It was thought that the longer the poison could be kept floating, the more effective it would be, and under the conditions obtaining in the cistern under experiment, some diluent had to be used which would be least affected by the strong breeze blowing across the open tank, and further, would withstand the drowning action set up by the agitation of the surface water caused by a one-inch main pouring into it full-bore during refilling.

Different materials were thought of and tried out, first in basin experiments, and then under working conditions. Of these,

(*a*) Cork powder was suitable but too expensive;

(*b*) Sawdust had a tendency to sink after a short time and form a layer at the bottom which had to be cleaned often;

(*c*) Fine road-dust sinks too quickly and does not withstand agitation or wind action;

(*d*) Flue-dust—the very fine powder obtained after cleaning the boiler flues—was better in floating qualities, and worked quite satisfactorily in destroying larvæ.

But the best material for the purpose in view proved to be

(*e*) French chalk. It forms a very thin even film on the surface, which lasts for about four days if the water is undisturbed as in the case of a closed tank, and almost refuses to be drowned by agitation.

[French chalk is finely powdered magnesium silicate, and in its crude form of steatite, is readily obtainable in the Indian bazaar as smooth hard pieces under the name of *Sangjiru;* the pieces can be easily ground in a mortar into a fine powder which can be passed through muslin to ensure uniformity; it is cheaper than the imported powder.]

The cistern in which these experiments were carried out is 32′ × 16′ × 6′ deep, and holds about 13,000 gallons of water. It is about 50′ from the ground level, and has no roof or cover. It is known as a hydrant tank, and unlike the sprinkler tanks above referred to, the water is in daily use and is being constantly replenished. Larvæ of *Anopheles stephensi* were found again and again in it, though in the stagnant water of a sprinkler tank next door, none could be found.

According to the quantity of Paris green recommended for wells and cisterns by L. W. Hackett (from the Stazione Sperimentale per la Antimalarica, Roma) 40 grains of the drug were incorporated with 8 oz. of French chalk and sprinkled on the water (about 500 sq. ft. of surface). When seen after two hours, a strong breeze was blowing across the open mouth of the cistern, and the thin film of the powder could be seen to be repeatedly broken, but would as often re-form as soon as the force of the wind abated a little. We look upon this as a very important physical property of French chalk for our purpose. On examining the cistern the next day, no larvæ could be found: on the third day, a few very early larvæ again appeared, showing as is already known, that the eggs were not affected. On the other hand, in a closed cistern of similar construction which was treated with a similar quantity of the Paris green French chalk mixture, the powder formed a thin scum on the surface for five days, and no larvæ were detected for a week. The water of this latter cistern was stagnant, there was no disturbance of the surface, and Anopheles were breeding profusely before treatment.

We have also tried sublimed sulphur as a diluent of Paris green in basin experiments, and found it quite suitable for the purpose: but it has no special advantage over French chalk.

Conclusion.

For use on a small scale in cisterns and wells, French chalk is an ideal diluent for Paris green.

QUALITY OF MILK OF SOME SPECIAL BREEDS OF HIMALAYAN COWS.

By N. K. ROY, B.A.,

Chemist, Darjeeling Municipality.

THE extraordinarily high percentage of fat in the milk of certain varieties of Darjeeling cows was first noticed in a sample of milk sent up for examination, in which no less than 7·5 per cent. of fat was determined. Subsequently, an attempt was made to collect some data from which the actual quality of milk obtained from certain breeds of cows might be arrived at.

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During the years 1924 and 1925, 277 samples of milk were examined from individual cows of all available strains, young and old alike, at different stages of lactation and yielding varying amounts of milk per day.

Four breeds of cows are found at Darjeeling—*Siri** (which are well suited to the high lands of the Himalayas—*Darjeeling District Gazetteer*), Nepali,* English, and cross-bred between any two of these three, or between a cross-bred and any one of the other.

The main factors on which the variation in the composition of milk depend are:—

(*a*) Time of milking—The morning milk was always selected for examination. In one sample of evening milk no less than 10·8 per cent. of fat was obtained. (In every case the cow was milked before me or my assistant who was specially deputed for the purpose.)

(*b*) Age and period of lactation—Milk from cows of different ages and at various stages of lactation was collected for examination.

(*c*) Climatic conditions and food—These varieties are mostly found in the adjoining tea gardens at a somewhat lower elevation. As regards the food, green grass is used in all cases. This is supplemented by powdered maize boiled with water and mixed with salt in the case of poorer people who cannot afford to keep English cows; whilst the owners of the English cows employ, in addition to the green grass, rahar and rice, or gram and rice, or all three together, boiled with water and mixed with a little salt. Sometimes oil cakes are also used.

The striking feature of the Siri and Nepali cows is the extraordinarily high fat-content of the milk. The yield is much lower than that obtained from English cows—a well-fed *Siri* cow giving about six seers and a Nepali cow two seers of milk daily. These figures are quite good as compared with the other milch cattle existing in India, in which case according to Isa Tweed (*Cow Keeping in India*), a good average is 5 lbs. a day or 750 lbs. per lactation.

Percentage of fat in milk from the cows representing these four breeds in this area:—

Breed.	Number of samples examined.	Percentage of fat.			Remarks.	
		Maximum (a)	Minimum (b)	Average	The cow whose milk contained— the maximum percentage of fat as shown in column (a) daily yielded:—	the minimum percentage of fat as shown in column (b) daily yielded:—
English ..	57	6·4	1·2	4·4	6 lbs. milk.	10 lbs. milk.
Siri ..	62	9·8	3·5	5·7	3 lbs. ,,	6 lbs. ,,
Nepali ..	86	8·8	3·3	5·7	8 lbs. ,,	8 lbs. ,,
Cross-bred ..	72	7 0	3·1	5·0	6 lbs. ,,	7 lbs. ,,

were not exactly identical in all cases. While the English cows and many of the cross-bred varieties are generally kept at the elevation of Darjeeling town, the "Siri" and "Nepali"

In the case of *Siri* and Nepali cows, it is found that 42·6 per cent. of the samples examined contain above 6 per cent. of fat and 27·0 of the samples have fat values below 5 per cent.

It might be expected that if the animals are unquestionably pure-bred Nepali and *Siri* cows, and if they are kept under conditions more suitable for the individual species the percentage of fat would be still higher.

It will be noticed, however, that the other constituents of milk from the Siri and Nepali cows undergo very slight variations. Some typical examples are given below.

These figures show that the milk constituents are practically as high as those from the majority of buffaloes. It is very interesting to compare these results with those obtained in the case of the best cows (Indian and foreign), as supplied by the Imperial Agricultural Chemist, Pusa, Bihar.

* The owners supplied the information so far as the breeds are concerned. The *Darjeeling District Gazetteer* mentions that most of the cattle in the district are *Siri-Kutcha* (which are crosses between Nepali cows and Siri bulls) of sorts. "There are a few tame specimens of the *Methun*, also known as *Gayal* (which are really wild cattle in the Bhutan, Burmese and other jungles) to be found and some crosses between it and the Siri breed, but they are very few in number." Mr. H. R. Enmunds, Superintendent of Agriculture, Darjeeling, says "Generally speaking, the pure bred Nepali and Siri cattle are, with very few exceptions, extinct around these hills. There are many cattle resembling these two breeds which have deteriorated from the original stock by intermixing. Siris are indigenous to Bhutan and the Nepali cows to Nepal." It will thus appear that most of the cattle which still locally pass for Siri and Nepali cows are not pure bred.

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Breed.	Months in milk.	Yield of milk per day (in lbs.)	% Total solids.	% Fat.	% Non-fatty solids.	% Lactose.	% Mineral matter.	% Protein.
Nepali	6	10	16·03	6·4	9·63	4·4	·84	4·39
Do.	4	6	15·92	6·8	9·12	4·4	·79	3·93
Do.	5	5	16·90	7·1	9·80	4·9	·80	4·10
Do.	1	6	17·30	7·2	10·10	4·9	·74	4·46
Do.	4	4	16·80	7·3	9·50	4·8	·80	3·90
Do.	2	4	16·40	7·4	9·00	4·5	·70	3·80
Do.	3	8	16·80	7·4	9·40	4·6	·73	4·07
Do.	5	3	17·40	7·4	10·00	4·8	·80	4·40
Do.	4	3	16·80	8·2	8·60	4·7	·70	3·20
Siri	5	2	15·10	5·9	9·20	4·7	·76	3·74
Do.	7	4	15·40	6·2	9·20	4·9	·70	3·60
Do.	7	6	15·50	6·4	9·10	4·8	·69	3·61
Do.	4	3	15·70	6·6	9·10	4·7	·78	3·62
Do.	4	6	16·17	6·7	9·47	4·4	·78	4·29
Do.	2	4	16·20	7·3	8·90	4·5	·68	3·72
Do.	1	4	17·10	7·6	9·50	5·3	·75	3·45
Do.	2	8	17·20	7·8	9·40	4·7	·73	3·97
Do.	6	8	19·20	9·7	9·50	5·05	·75	3·70
Average of the above 18 samples	..	..	16·55	7·2	9·35	4·7	·75	3·90

Breed.	% Total solids.	% Fat.	% Non-fatty solids.	Reference.
Britain—				
Jersey	14·65	5·43	9·22	Murray's *Chemistry of Dairying.*
Guernsey	14·46	5·16	9·30	"
Kerry	13·54	4·67	8·87	"
Ayrshire	13·46	4·24	9·22	"
Shorthorn	12·78	3·92	8·86	"
Holstein	12·12	3·51	8·61	Richmond's *Dairy Chemistry.*
Red polled	13·22	4·34	8·88	Richmond's *Dairy Chemistry.*

Breed.	% Total Solids.			% Fat.			% Non-fatty Solids.			Reference.
	Max.	Min.	Aver.	Max.	Min.	Aver.	Max.	Min.	Aver.	
Indian—										
Burmese (Mandalay) ..	..	..	14·05	..	..	4·91	..	..	9·14	Warth.
Surati	..	..	14·77	..	..	5·38	..	..	9·39	Dr. Joshi.
Kirkee (Poona) ..	15·19	14·2	..	5·80	5·30	..	..	..	..	Meggit & Mann.
Saidapet— (Unknown— Nellore ?) ..	15·52	13·02	..	6·07	4·00	..	..	..	..	Dr. Leather.
Jaffrabadi	..	..	15·82	..	..	6·10	..	..	9·72	Dr. Joshi.
Hariana (Lucknow) ..	15·15	11·69	..	6·29	2·94	..	9·43	8·44	...	McMahan.
Montgomery (Pusa)	..	..	14·04	7·5	3·0	5·4	..	..	8·64	....
Sindi (Poona) .	..	..	..	8·4	2·9	..	..	..	9·43	Meggit & Mann.
Cross-bred (Ayr x Mont. Pusa)	..	..	12·62	8·6	2·8	4·2	..	..	8·42	....
Gir or Kathiwadi (Poona) ..	..	..	..	9·0	3·1	..	..	..	8·93	Meggit & Mann.
Foreign countries — British East Africa	..	..	14·5	7·2	4·9	5·25	..	..	9·25	Kirkham & Barnes.
Illinois (U. S. A.) ..	15·1	10·9	..	5·6	2·7	..	10·1	7·5	..	Murray's *Chemistry of Dairying.*
England (Worker— Richmond) ..	..	..	12·8	12·52	1·04	3·9	..	..	..	Murray's *Chemistry of Dairying.*
Germany— (Worker- Fleischmann) ..	..	..	12·25	10·30	2·7	3·4	..	..	..	Murray's *Chemistry of Dairying.*
America (Worker— Snyder)	..	..	12·5	6·50	3·45	3·6	..	..	..	Murray's *Chemistry of Dairying.*

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It will be seen from the table that a maximum of 12·52 per cent. of fat has been obtained by Richmond in England, but the minimum is also very low, namely, 1·04 per cent. A maximum of 9·8 per cent. of fat (and 10·8 per cent. of fat in a sample of evening milk) is found possible in the milk from *Siri* cows, and this, with rare exceptions, is the highest amount of fat, as far as records are available, which can be contained in cow's milk.

I must gratefully acknowledge my indebtedness to Dr. D. A. Farquharson, M.B., C.M., F.R.F.P. & S., D.P.H., Medical Officer of Health, Darjeeling Municipality, for giving me every facility in carrying out the work.

AN ANALYSIS OF 337 CASES OF ORIENTAL SORE TREATED BY VARIOUS METHODS.

By P. V. KARAMCHANDANI,
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ORIENTAL sore tends to run a prolonged course, and is a source of anxiety to the patient and of worry to the doctor. Any measure therefore which can shorten the course of this disease and be practicable in the mofussil, will be welcomed by the profession. With this object in view these few notes are written.

Summary of cases treated.

Number of cases.	Treatment.	Period of cure (average).
300	Intravenous injection of tartar emetic; starting with 5 c.c. of 1 per cent. solution every 3rd day; increasing up to 10 c.c. Three injections in all.	18 days.
20	*Operation.* Excision or scraping.	25 days.
5	*Ionisation.* (Zinc and antimony salts.)	?
5	*X-rays.* Subintensive, once a fortnight.	6 weeks.
5	*Berberine sulphate,* weekly injections.	2 weeks.
2	Locally with potassium permanganate and antimony ointment.	?

Out of 300 cases treated with intravenous antimony one case proved fatal. The patient got ill after the third injection and died within 72 hours of injection. It may be pointed out that these cases were treated in a general hospital and all precautions were taken prior to intravenous injections of tartar emetic. It will thus be seen that tartar emetic, although very useful, is not without risk—the question of technique and skill apart.

Twenty cases treated by scraping were done under general anæsthesia, as the object was to remove even the doubtful areas and obtain a comparatively safe area. The simple sores thereby produced took 25 days to heal on the average.

Ionisation was only a partial success. Two of the cases had to be scraped. The other three took nearly three months to heal.

X-rays were very successful. Although this is a painless remedy, it is not easily procurable, is expensive, and the period required to cure is as long as six weeks.

The results obtained with potassium permanganate and tartar emetic ointments were not encouraging, since the sores took 8 to 10 weeks to heal; the patients got tired and each was given one intravenous injection of tartar emetic.

Berberine sulphate, although a new drug for oriental sores, promises well. It is a bright yellow coloured salt of berberine ($C_{20}H_{17}NO_4$) which is contained in *Hydrastis* and *Calumba*, but it is obtained principally from the bark of *Berberis vulgaris* and other species of berberry. It can be obtained from any well known chemist. The technique is simple, the treatment easy of administration, and results very encouraging. The number of cases treated is small no doubt, but the results obtained are so brilliant in comparison with previous cases, that I may be pardoned if I assert that "in berberine sulphate we have a remedy which must be universally tried."

The technique is simple: $\frac{1}{4}$ grain of this yellow salt is dissolved in $1\frac{1}{2}$ c.c. of aqua distillata, sterilized and injected subcutaneously. The needle is inserted $\frac{1}{2}$ in. away from the margin of the sore, and passed for some distance, till it reaches the edge, where about $\frac{1}{2}$ c.c. of solution is emptied; then $\frac{1}{2}$ c.c. of the remaining solution is injected a little above and $\frac{1}{2}$ c.c. below the first point. A second injection is given a week later on the opposite side of the sore in the same way. It has been my experience that injection at one spot affects 3 to 4 sores within an area of 3 square inches. Local reaction is nil in some cases. These only have intense itching. Within a week early sores dry up, whereas the big open sores develop healthy granulations. I did not find more than 2 injections necessary when a dressing of hypertonic saline solution was used in conjunction with the berberine injections. It is my belief that hypertonic saline solution fomentations are specially valuable when the sore is discharging offensive pus, and may lower the vitality of the leishmania. When the sore clears up normal saline solution dressings are resorted to. This treatment is free from risks and the period of cure compares favourably with that by intravenous tartar emetic.

DEEP INFILTRATION ANÆSTHESIA IN OPHTHALMIC OPERATIONS.

By MAJOR J. N. DUGGAN, D.O. (Oxon.), F.C.P.S.,
Superintendent, Sir C. J. Ophthalmic Hospital, and Professor of Ophthalmology, Grant Medical College

PAINLESS surgery has always been the aim of all surgeons. Ever since the introduction of

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general anæsthesia with chloroform and æther, surgeons have been able to perform any difficult operation painlessly. However, a surgeon is often confronted with the post-anæsthetic effects of a general anæsthesia; besides he has always to depend upon the assistance of a skilled anæsthetist as the dangers involved in the satisfactory administration of the anæsthetic are many, and can only be avoided by those who have obtained skill by long experience. Ophthalmic surgeons perform nearly all their major operations under local anæsthesia. Except for a few occasions, general anæsthesia finds a secondary place in ophthalmic surgery for obvious reasons. The after effects of the general anæsthesia are a great hindrance to the successful termination of a cataract operation. Thus if post-anæsthetic vomiting occurs in such an operation, the fresh wound may gape open and vitreous may be lost; the iris may be prolapsed and become incarcerated; in old arterio-sclerotic patients, intraocular hæmorrhage may take place; sepsis may occur, leading to panophthalmitis. These and many other complications would spoil the result of an operation. Ophthalmic surgeons have generally to deal with very elderly patients of feeble constitution, in whom a general anæsthesia is oftentimes contra-indicated. Although the field of operation of an ophthalmic surgeon is limited to the small orbital area of the face, he requires enough room to perform the operation with ease and dexterity. Besides, it becomes very inconvenient to operate on the eye, if a chloroform inhaler occupies too much of the face and hinders the operation in this way.

It appears ridiculous at times to administer a general anæsthetic to enucleate an eyeball or perform a cataract operation—operations which last but a few minutes. For these and various other reasons, general anæsthesia is rather unpopular with ophthalmic surgeons. Koller's introduction in 1884 of cocaine anæsthesia by instillation of the drug in the conjunctival sac has been one of the greatest contributions to ophthalmic surgery. With this kind of anæsthesia, any operation can be performed upon the anterior segment of the eye, in its non-inflammatory condition. Since the year 1884, many new local anæsthetics have been discovered so that now anæsthesia may be obtained for operation upon the conjunctiva, sclera and cornea in non-inflammatory conditions by the use of diocaine, holocaine, butyn, borocaine, beta-borocaine and a host of others, either alone or in combination. But this instillation anæsthesia is not complete. Many a time even in some non-inflammatory conditions, while performing an iridectomy, it is nearly impossible to avoid more or less severe pain. This is a very important fact, particularly in cataract operations.

In inflamed conditions of the eye, surgery often becomes painful because the anæsthesia produced by instillation is not sufficient. Hence instillation has to be reinforced by sub-conjunctival injection, as in performing an enucleation. But even with this local sub-conjunctival anæsthesia, the percentage of painful cases is high. The reasons for this are very simple. Firstly, the actual injection in the inflamed eye is painful. The needle has to pass through a sensitive membrane like the conjunctiva and tissues surrounding the eye in order to obtain anæsthesia. And secondly, the inflammed and the hyperæmic tissues offer resistance to the quick absorption of cocaine and all its derivatives. The nerve filaments remain very imperfectly anæsthetised; the subjacent globe is still more sensitive so that traction and pressure produce severe pain. Very little absorption of the anæsthetic occurs in such a case. Thus the patient has already suffered great pain before the actual and more painful operation is even attempted. In such cases, it is not the anæsthetic that is at fault but the method of employment is blameworthy. In non-inflammatory conditions, the injection anæsthesia is not entirely devoid of pain in many cases of enucleations, and the dragging pain complained of at the time of cutting the muscles and the optic nerve is so severe that often the patient has to be treated for shock after the operation.

With this somewhat imperfect and unsatisfactory anæsthesia in inflamed eyes, the surgeon has to struggle through the operation. Muscle-cutting is painful; optic neurectomy results in shock and the pain thus caused makes the patient wriggle on the table, and squeeze the lids forcibly, so much so that often the speculum jumps out of the lids, and in high-tensioned and perforated globes the contents are easily squeezed out of the wound; the operation has to be hurried through under the circumstances. The mutilation of the orbital tissue with the unnecessary destruction of the conjunctiva in such cases, is an inevitable result.

To eliminate these evils, the want of a better anæsthesia was strongly felt. In the Sir Cowasji Jehangir Ophthalmic Hospital, Bombay, the older methods still prevailed until in November 1926, Drs. Green and Icove of San Francisco paid a visit to the hospital and showed me their very effective method of deep intraorbital anæsthesia. Dr. Green is a great exponent of this method. He and his colleague Dr. L. D. Green have found this anæsthesia so very effective and harmless in operations for acute and chronic glaucoma, whether for trephining or iridectomy, in secondary glaucoma from plastic iritis, enucleations, muscle operations and for the severe pain produced by the sub-conjunctival injections of mercurial solution, that they finally mustered up sufficient courage to employ it for all cataract operations in a routine way. In the Sir C. J. Ophthalmic Hospital, the method I was employing in performing enucleations, was as follows:—In inflammatory and painful cases, general anæsthesia was used to avoid all pain. In non-inflammatory cases, instillation with sub-conjunctival injections was practised. The conjunctival sac was anæsthetised by instillation of cocaine drops first and afterwards 1 c.c. of a

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2 per cent. solution of novocain was injected in the course of the four recti muscles, the needle going as far back as the optic nerve. Even with this, the anæsthesia was imperfect and unsatisfactory. Since the introduction of Dr. Green's method of deep orbital anæsthesia, I have been able to avoid all the complications attendant upon the older method.

The present technique employed in the Sir C. J. Ophthalmic Hospital is as follows:—

Sterilization.—The skin of the lids and that surrounding the orbit is thoroughly cleansed with absolute alcohol. It is afterwards painted freely with tincture of iodine.

The syringe used is a 5 c.c. Record to which a sharp pointed and thin needle about 4 to 4½ cm. in length is attached. The syringe is thoroughly cleaned with absolute alcohol and boiled for a few minutes before it is used.

Solution.—The solution used is 2 to 4 per cent. novocain to which a few drops of fresh liquor adrenalin chloride are added. The solution is always freshly prepared and preferably in normal saline. It is filtered and boiled for a few minutes and kept ready. The amount of the solution injected in enucleations varies from 2 to 4 c.c. The greater the inflammation, the larger the quantity required to be injected or the stronger the solution (up to 4 per cent.) to be used. The quantity necessary for injection in cataract extractions is 1 c.c. of a 2 per cent. or half c.c. of a 4 per cent. solution, at the back of the eye.

Injection.—The patient is made to lie down on the table. With a sterilized piece of lint, the skin in the neighbourhood of the external canthus is wiped dry; the lower margin of the orbit is felt for. Between this and the margin of the lid near the external canthus, the needle is introduced through the skin and pushed to its full length into the orbit along its floor, directing it slightly inward and upward, following a path between the external and the inferior recti muscles. The insertion of the needle is sometimes rather painful but if done quickly, it is soon forgotten. Two c.c. of the solution is injected there. By changing a little above and below the original direction of the needle on the outer side of the optic nerve, the syringe is emptied before withdrawing the needle. Thus we enter the orbit through the skin and not through the conjunctiva, with a long needle, as our object is not to give a sub-conjunctival injection but one exclusively intraorbital to produce complete anæsthesia; how this is achieved may be learnt by considering the anatomy of the posterior part of the orbit.

The ciliary ganglion is a small reddish brown structure, pin-head in size, and situated in the posterior part of the orbit between the optic nerve and the external rectus muscle, about 15 mm. behind the eyeball. It has three roots, a motor, a sensory and a sympathetic, of which we are concerned with the first two. The nerves which we wish to block are the short and long ciliary nerves and they are best reached just anterior to the ciliary ganglion. By entering the needle through the skin in the situation pointed out above, the operator is enabled to reach both these nerves of the eyeball without disturbing the inflamed and painful conjunctiva. The motor and sensory nerves are thus thoroughly paralysed; sensation to the cornea, iris and sclerotic is abolished; the anæsthesia is complete. The palpebral fissure widens and the eye becomes prominent and this makes the operation painless and much easier.

To anæsthetise the lids, a second injection is made. The needle is introduced external to and about half an inch from the external canthus, pushed upwards and inwards towards the supra-orbital notch, injecting gradually as the needle is pushed along. The lower lid is then anæsthetised by injecting a small amount into it. In cases where the surgeon has in mind to perform canthoplasty during a cataract operation in prominent eyes and in cases of small palpebral fissures and also if he desires to paralyse the facial nerve fibres, a small amount may be injected in the external canthus.

The anæsthesia is complete after 30 to 40 minutes; operations should not be undertaken earlier than half an hour at least, as it takes a longer time for the solution to filter through the orbital tissues. The anæsthesia lasts for at least two hours.

Here I may mention a few cases to prove the efficacy of these injections.

Case 1.—A patient, aged 55, had suffered from acute glaucoma for which she was operated upon, elsewhere. When she came in, she was nearly in a state of collapse with cold clammy perspiration on her body and had to be taken in on a stretcher. There was blood in the anterior chamber; the tension was very high and she was in such severe and agonising pain that she came in with a determination to have the eyeball out as suggested to her by her doctor. She was taken up for enucleation. Intraorbital anæsthesia was used and I am glad to say I succeeded in removing the eyeball quite painlessly and without adding more to the shock from which she already suffered.

Case 2.—Another case was one of panophthalmitis after fever. In addition to panophthalmitis when he came in, the patient had marked orbital cellulitis and proptosis—a severely painful condition. The intraorbital anæsthesia method was used and the eyeball came out without pain and shock. At the Sir C. J. Hospital blind eyes having panophthalmitis are very often enucleated. This procedure has been followed in all such cases for several years past without even meeting with a single case of meningitis or any other complication arising from it.

Case 3.—An old cyclitic eye with no perception of light had suffered from traumatism. The anterior chamber was full of blood; secondary glaucoma with severe pain had set in. Yet this painful and ruptured eyeball was enucleated under intraorbital anæsthesia without causing increased pain or being followed by shock.

These are a few cases, quite enough to convince anyone how useful and efficient this method of anæsthesia is. I found this anæsthesia so thoroughly effective and satisfactory in enucleations, in acute and chronic glaucomas and in a number of Barraquer's and other cataract operations, which I had the opportunity of doing with Drs. Green and Icove of San Francisco in

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November last, that I have adopted this form of anæsthesia as a routine for enucleations, except in the case of young children, in a certain percentage of cases suffering from glaucoma, and for cataract extractions in unruly and nervous patients. The recti muscles are inhibited in their action; the squeezing action of the lids is eliminated; vitreous loss is minimised and the surgeon gets a chance of finishing the operation as he likes. I have done a few hundred injections up to date with proper aseptic and antiseptic precautions. In my cases, I have never met with any case which had septic complications as a result of the deep injections, neither have I encountered any serious untoward effects of the injection, excepting two cases which I would like to mention here. These were cases of panophthalmitis in two very badly nourished patients. General anæsthesia was out of the question and therefore I decided to operate upon them with intraorbital anæsthesia. After operation they went into a state of mild collapse with sweating all over the body and vomiting. They were soon brought round however by stimulant lines of treatment.

Lastly, before I conclude, my sincere and grateful thanks are due to Drs. Green and Icove of San Francisco who were kind enough to work with me on two successive mornings, doing with me many Barraquer's cataract extractions, enucleations and a few others, especially their lid operations for trachoma—all under their own method of intraorbital anæsthesia.

THE POSSIBLE PATHOGENICITY OF *GIARDIA INTESTINALIS.*

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THE rôle which *Giardia intestinalis* may play in the production of intestinal symptoms is still a disputed point. Nothing very definite can be stated one way or the other. It is claimed on the one hand that it is frequently present in healthy persons and not associated with disease; on the other, that in some cases it may be the cause of an intractable and debilitating diarrhœa, even, perhaps, of dysentery. Those who put forward a claim that this organism is pathogenic base their claim chiefly on (1) the frequent finding of this parasite in its vegetative or encysted phases in diarrhœic stools; (2) the occurrence of periodic attacks of diarrhœa, associated with the passage of large amounts of mucus, in which enormous numbers of the parasite may be found, in persons known to be infected with *Giardia intestinalis.*

Wenyon (1926) in his *Protozoology,* p. 703, writes, "It is difficult to avoid the impression that mucus has been produced at that part of the intestine where the flagellates are most numerous, and is the result of irritation set up by their presence. It is possible that certain individuals are more susceptible than others, the attacks of diarrhœa corresponding with periods of active multiplication of the flagellates." There is no evidence however that *Giardia intestinalis* ever causes ulceration of the gut epithelium, or even that it penetrates into such epithelium.

Giardia infection is very widespread. Wenyon and O'Connor, working in Alexandria during the war, found from 4 to 16 per cent. of the normal population of Egypt infected; Dobell records from 18 to 22 per cent. of an artisan population of the British Isles as infected; Boeck found 48 per cent. of industrial school children in America infected.

It is consequently difficult to attribute intestinal symptoms to the sole presence of this parasite, since harmless infection is so widespread. Possibly secondary and associated factors may be present; just as it has been claimed that in infections with *Entamœba histolytica* secondary invasions of the minimal ulcers present in the carrier state may possibly be of importance in converting the "carrier" condition present into one of amœbic dysentery.

Whilst working under Major R. Knowles, I.M.S., at the Calcutta School of Tropical Medicine, during the course of routine examination of 1,750 stools from in-door patients at the Carmichael Hospital for Tropical Diseases, Calcutta—(in many instances involving repeated examination of the stools of the same patient)—it was found that 6·2 per cent. of the patients concerned harboured *Giardia intestinalis.* In 24·5 per cent. of these infected patients a concurrent infection with *Entamœba histolytica* was also present.

In the majority of these cases the stools were non-dysenteric in character. Many other cases were also seen in which Giardia cysts were present in the stool together with Charcot Leyden crystals. The presence of Charcot Leyden crystals in the stools has been taken by Acton, and by Thomson and Robertson as almost, if not quite, pathognomic of infection with *E. histolytica;* and in the above series of cases the special association of infection with *Giardia intestinalis* with either *Entamœba histolytica* or with Charcot Leyden crystals appears to be incapable of explanation as a mere coincidence. In treating patients with an amœbic infection, Giardia cysts appear in the stool especially during and after the cessation of treatment. If such a patient be seen some time after termination of treatment for his amœbic infection, but still suffering from diarrhœa or looseness of the bowels, with *E. histolytica* absent from his stools on repeated examination, but cysts of *Giardia intestinalis* present in abundance, it is difficult not to incriminate the latter parasite as possibly pathogenic. Stovarsol may sometimes relieve such a condition, but it is by no means invariably successful.

The following case histories may serve to illustrate the points mentioned:—

Case 1.—European adult male. Dysentery two years previously, for which treated with 10 injections of

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emetine. Suffering for some time before admission with intractable diarrhœa, with occasional passage of mucus, but no blood. Had an injection of emetine just prior to coming to hospital. Examination of the diarrhœic stools on several consecutive days after admission showed abundant Giardia cysts present. The patient was put on to stovarsol treatment. About a month later examination of a fluid stool showed vegetative forms of *E. histolytica*, but no Giardia present. Emetine then relieved the symptoms.

Case 2.—Hindu male; had dysentery two years previously, treated by a course of emetine. Thereafter irregular diarrhœa off and on. Examination of the stools at the Patna Medical College showed Giardia cysts in abundance and the trouble was ascribed to this parasite. On admission to the Carmichael Hospital for Tropical Diseases, Calcutta, examination of the stools showed scanty vegetative *E. histolytica*, numerous Giardia cysts, and strongyloid larvæ. Treatment with emetine plus large doses of bismuth subnitrate relieved the symptoms.

Case 3.—Hindu male, with a history of dysentery thirteen years previously, followed by irregular diarrhœa and constipation for many years. On repeated examination of the stools cysts of *E. histolytica* were once found in scanty numbers, but numerous cysts of *Giardia intestinalis* were always present.

No assumption is here made that in all cases presenting symptoms and associated with the presence of cysts of *Giardia intestinalis* in the stools, a concurrent infection with *Entamœba histolytica* is always present. But there appears to be a closer association between infection with *Giardia intestinalis* and *Entamœba histolytica* or with Charcot Leyden crystals present in the stools than mere coincidence will account for. The association may be of the nature of a partial correlation, dependent upon other factors. But it is as well that whenever the stools of a patient show *Giardia intestinalis* to be present, repeated examinations of the stools should be made for the possible presence *also* of *Entamœba histolytica*.

PHYSICAL EFFICIENCY IN HOOKWORM INFECTION.

A PRELIMINARY REPORT.

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For a long time it has been known that hookworm infection causes loss of physical and mental efficiency in the persons affected. The degree of this loss has been supposed to depend upon the number of worms harboured in the system. Recent work on the subject, however, shows that there is a wide difference of opinion amongst workers. For instance Strong (1916) investigating the effects of hookworm disease on the mental and physical development of school children, came to the conclusion that it interfered with physical development and that treatment alleviated this condition to a considerable extent. On the other hand Hill (1923) records 282 cases, of which 142 cases with 1 to 2,099 ova per gramme showed no symptoms, while 57 with 2,100 to 5,099 ova only showed very slight and indefinite symptoms. The heaviest infected subject was a Negro woman of 50 with an egg count of 11,100 ova per gramme with no symptoms whatsoever. Clayton Lane (1917), in his final report on the ankylostomiasis inquiry in the Darjeeling district, concluded that the infections were mostly light and that the majority of those infected should be classed as carriers. He also observed that the freeing of the carriers from infection had been followed by a marked improvement in their health and energy, thus showing that light infections had a harmful effect on the host, and that no infection, however light, could be disregarded as entirely harmless to the host—all infections were of sanitary importance. Mhaskar and Kendrick (1923) state that an infection of less than 20 hookworms has but little bearing on the deterioration of health and quality of labour. In the studies of the International Health Board (1924) in Alabama it was found that no decrease in height, weight, vital capacity or hæmoglobin could be determined in children harbouring less than 100 worms. Those who presented the common clinical picture of hookworm infection harboured 500 hookworms or more. Gordon (1925) observes that individuals with a high degree of infection do not necessarily show a low standard of physique and general fitness, but that there may be some association between ankylostome infections of more than 15,000 ova per gramme of fæces and the low standard of energy observed in a few cases. Smillie and Augustine (1926) found no ill effects in children with under 100 worms and stated that those with less than 25 worms did not show any change in height, weight or hæmoglobin value after treatment. Darling is of opinion that communities in which the hookworm index is less than 50 do not urgently require treatment.

In the face of such controversial statements it is difficult to decide whether light hookworm infection lowers the efficiency of the person infected or not.

Within the last few years, a few physical efficiency tests have been devised. Of these, the cardio-vascular test as described by Schneider (1920) has been adopted by the Medical Division of the United States Air Service. For the purpose of aiding flight surgeons in judging the fitness of aviators, a point system of grading a few cardio-vascular reactions was proposed by Schneider. This point system used for grading physical fitness weighs data from six sets of observations, viz., the pulse rate during recumbency the scanding pulse rate the increase in the pulse rate on standing, the acceleration of the pulse rate after a standard exercise, the time required for the pulse rate to return to normal after exercise, and the alteration in the systolic arterial pressure when the change is made from recumbency to standing. A scheme of scoring was adopted instead of a percentage

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rating in order to avoid resentment of the subject under consideration, in case he fell decidedly below the average (Schneider, 1923). The maximum point attached to each finding is 3, so that a perfect score, the sum of values given to each of the six items, is 18. It has been suggested by Schneider that a score of 9 or less is characteristic of physically unfit men. Scott (1921) has found that a score of 7 or less is an indication of improper functioning of the neuro-circulatory apparatus. From a study of 410 men, he comes to the conclusion that those with a score of 8 or more will be qualified on physical examination, and those with a score of 7 or less will be disqualified. According to him, Schneider's test is the best test so far offered for measuring physical efficiency and fatigue. Finkelstein and Williams (1922), in comparing Schneider's test with another physical test have found that cardiac efficiency is probably a good indication of general physical efficiency.

De Almeida and Pessoa (1922) carried out Schneider's test on some children with hookworm infection and concluded that the differences were too small to warrant their making any deductions of value from the test.

Hitherto Schneider's test has not been done in this country and therefore we have had no available normal figures for healthy Indians. To find out the normal figures for healthy individuals, as also the variations, if any, in hookworm infection, an investigation was conducted among prisoners in the Alipore Presidency Jail with the kind permission of the Superintendent, Lieutenant-Colonel N. S. Simpson, I.M.S.

A preliminary examination of the stools of one hundred prisoners was done by Lane's D. C. F. method. Of these, 53 were found to contain hookworm ova. Twenty-seven non-infected and forty-four infected prisoners were selected for study. Schneider's test was done on the 27 healthy prisoners first to determine the normal figures. Schneider's technique was rigidly adhered to throughout.

The tests were all done at the same time of the day, between 11 a.m. and 12 noon on an empty stomach, i.e., before the mid-day meal. The results are shown in Table I. It will be seen that the score varied from 7 to 18. Two cases scored 7, one of which (No. 8), however, gave a score of 11 one month later, while the other case (No. 18) showed a still further reduction. This patient had a persistent tachycardia without any other sign of debility. His heart was otherwise normal, the score being reduced on account of the quick pulse only. Evidently he had some disorder of the neuro-circulatory apparatus (? Graves' disease). As will be seen from the table, height or weight has no relationship whatsoever with the score, and so they have been left out of consideration in later work. From the scores obtained, it appears that Schneider's figures are applicable to Indians and on the basis of this, further work was done.

TABLE I.

Showing the scores of healthy prisoners.

Second test was done one month after the first.

Case No.	Age.	Weight.	Height. Ft.	Height. in.	1st Score.	2nd Score.
1	27	106	5	2¼	14	14
2	26	105	5	3	13	13
3	27	115	5	6½	15	13
4	35	110	5	7	18	17
5	40	90	5	3	15	13
6	25	90	5	3	16	16
7	24	95	5	3½	9	9
8	25	105	5	1½	7	11
9	21	102	5	6	9	9
10	19	125	5	6	12	16
11	30	100	5	3½	17	15
12	40	70	5	0	13	15
13	30	105	5	2¾	13	11
14	30	106	5	5	14	14
15	24	112	5	4½	15	12
16	45	108	5	5	14	12
17	30	114	5	3	13	15
18	37	100	5	6	7	4
19	26	85	5	1½	15	12
20	30	90	5	2	16	16
21	25	95	5	2	14	13
22	27	117	5	4½	17	11
23	28	107	5	6½	16	14
24	48	73	5	0	9	9
25	30	117	5	3½	17	15
26	35	117	5	8	11	9
27	29	114	5	2	17	14

To determine the degree of infection, egg-counts were done on all the positive cases for four consecutive days and the average taken. The method adopted was the Stoll technique as modified by Chandler (1925). The positive cases were divided into two equal batches; tests were done on all of them as mentioned before, but only one batch was treated in the first instance, the other being kept as control. The results obtained before and after treatment of the first batch are shown in Table II. It will be seen that the prisoner with the highest egg-count of 7,600, had a score of 10, while the lowest score of 4 was given by one with an egg-count of 1,750 only. This latter patient had the typical hookworm picture with puffy face, pale conjunctivæ and anæmic tongue. His condition improved after treatment and his score was raised to 7 one month later.

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TABLE II.

Showing the scores of prisoners with hookworm infection and the result of treatment.

Case No.	Age	Average e p g.	1st Score.	No. of treat-ments.	Result.	2nd Score.
1*a*	26	600	10	3	(+)	11
2*a*	33	7,600	10	3	(+)	17
3*a*	31	400	12	1	C	15
4*a*	20	900	10	2	C	9
5*a*	18	500	14	1	C	13
6*a*	28	100	17	1	C	15
7*a*	35	200	10	3	(+)	8
8*a*	28	200	17	1	C	17
9*a*	27	40	7	1	C	10
10*a*	38	40	9	1	C	14
11*a*	35	40	16	1	C	15
12*a*	25	900	10	1	C	9
13*a*	26	40	10	1	C	13
14*a*	27	200	9	3	(+)	14
15*a*	36	800	16	3	(+)	17
16*a*	21	40	17	1	C	15
17*a*	37	1,750	4	3	(+)	7
18*a*	27	40	8	1	C	8
19*a*	23	100	13	2	C	10
20*a*	40	300	14	3	(+)	17
21*a*	38	40	16	1	C	14
22*a*	25	40	12	3	(+)	15

e.p.g.=eggs per gramme.
(+)=egg-count of 40 per gramme.
C=cured.

All these cases were given the combined treatment of chenopodium and carbon tetrachloride; the number of treatments given and the results are shown in the table. Eight cases were not cured even with three treatments, but their egg-counts were all reduced to 40 per gramme, except in the case of 22*a*, where no worms appeared to have been expelled. One month after the last anthelmintic dose, a second test was done on all of them. It is interesting to note that in Case No. 2*a* with the highest egg-count, there was a definite increase of the score from 10 to 17. An increase was also noted in cases Nos. 10*a* and 14*a* where the scores were raised from 9 to 14. In some cases, instead of a rise, there was a falling off of the scores, but in no instance was this more than 3, which is probably within the range of normal variations. It appears therefore that the expulsion of worms had no effect in definitely increasing the score, except in three cases.

On comparing the second set of scores with the first in the case of the negative group (Table I) it will be noticed that no marked change was found, except that No. 18 had a fall of three points, making him still less efficient, and No. 22 showed a decrease of 6 points. This latter was accompanied by a fall of 8 lbs. in weight in one month; the probable reason of the former has already been referred to.

Coming now to the second batch of the positive cases as shown in Table III, the second set of scores taken one month after the first shows approximately the same variations as in the negative group. There was a drop of scores in 14 cases (57 per cent.) in the negative batch, while in this second batch, 12 cases (54·5 per cent.) showed a falling off. This drop, therefore, cannot be accounted for by the non-treatment of the cases and may be taken to indicate the limits of normal variations.

TABLE III.

Showing the scores of prisoners with hookworm infections the result of delayed treatment and treatment.

Case No.	Age.	Average e.p.g.	1st Score.	2nd Score.	No. of treat-ment.	Result.	3rd Score.
1*b*	22	1,850	11	8	1	C	12
2*b*	23	150	9	7	1	C	12
3*b*	26	100	17	17	1	C	15
4*b*	35	400	9	10	1	C	15
5*b*	40	40	14	14	1	C	14
6*b*	24	40	8	7	1	C	13
7*b*	32	40	17	14	1	C	14
8*b*	35	450	17	16	1	C	13
9*b*	32	200	13	10	1	C	14
10*b*	30	1,300	9	11	1	(+)	14
11*b*	35	300	13	11	1	(+)	12
12*b*	30	900	15	13	1	C	14
13*b*	23	40	8	8	1	C	12
14*b*	29	40	17	16	1	C	17
15*b*	34	300	16	16	1	C	15
16*b*	30	100	9	4	1	C	14
17*b*	27	40	16	12	1	C	16
18*b*	28	1,600	8	11	1	(+)	16
19*b*	40	300	14	15	1	(+)	12
20*b*	27	40	13	15	1	C	12
21*b*	35	40	15	12	1	C	12
22*b*	30	200	11	11	1	C	13

The result of treatment, however, shows a distinct elevation of score in those cases whose scores were near the border line of seven before treatment, and is especially noticeable in cases No. 6*b* (from 8 and 7 to 13), 16*b* (9 and 4 to 14) and in 18*b* (8 and 11 to 16). Whether these figures are normal variations or the effect of treatment, it is of course difficult to say from the small number of cases giving these figures. On the whole, however, it appears that light hookworm infections do not cause any appreciable loss of physical efficiency as demonstrated by Schneider's test, but that treatment seems to increase the efficiency score in some cases.

CONCLUSIONS.

1. Schneider's cardio-vascular test was done on 27 healthy Indian prisoners and the results obtained compare favourably with Schneider's American figures.

2. Schneider's test was done on 44 prisoners with light hookworm infection (egg-counts varying from 40 to 7,600 per gramme), and no demonstrable loss of physical efficiency was noticed.

3. Expulsion of the worms was not followed by any appreciable rise in the efficiency score, except in a few cases.

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My thanks are due to Lieutenant-Colonel N. S. Simpson, I.M.S., Superintendent of the Alipore Presidency Jail and his hospital staff for allowing me to carry out these investigations, and to Lieutenant-Colonel J. W. D. Megaw, I.M.S., Director of the School for valuable suggestions.

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A Mirror of Hospital Practice.

A CASE OF SWEATING BLOOD.

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A FEW weeks ago a medical man in Rangoon told me that he had a case under his observation of a Mahomedan lady who sweated blood.

She was a woman of about 50 years of age, who had ceased menstruating six months ago, and since her menses had stopped, she had begun to sweat blood—the bleeding taking place, curiously enough, only about the waist, in front.

I did not believe that his story could possibly be correct, but he insisted on the correctness of his description, and offered to show me the patient.

At the time of my examination the patient told me that she was not bleeding at the time, but that she had been bleeding, and it was obvious that the top of her *loongyi* (a skirt tied round the waist) was blood stained.

The first step in the examination was to expose the front of her chest and abdomen completely, and it was at once seen that there were numerous little black specks in the neighbourhood of each nipple, in the areola.

On examination with a lens these were seen to be fleas, burrowing into the skin.

It was obvious that the bleeding must have come from these small burrows.

It is the custom of the women when bathing to raise the *loongyi* from the level of the waist, and fasten it just above the breasts. It is clear therefore how the top of the *loongyi* would become blood stained, and would later smear the waist line with blood stains.

The patient was quite unaware of the fact that there was anything wrong with her breasts or nipples. Several of the fleas were removed and taken to the laboratory for examination. A note by Major Jolly, I.M.S., the Director of the Harcourt Butler Institute of Public Health is given below.

A Note by Major G. G. Jolly, I.M.S.

About the beginning of June, Major R. V. Morrison, I.M.S., Pathologist, Rangoon General Hospital, showed me two fleas mounted in Canada balsam which came from Col. Kelsall's case and told me that they had been identified by an entomologist as *Dermatophilus penetrans*.

I felt considerable doubt as to the diagnosis being correct, both in view of the history of the case related to me which did not reveal the presence of any gravid females, and upon endemiological grounds. My colleague Dr. E. S. Feegrade, I.M.D., who also examined the specimens, agreed with me that they might possibly be the fowl flea, *Echidnophaga gallinacea*, which is common in Burma and is very similar in appearance to the human "jigger."

I therefore asked Col. Kelsall for further details of the patient in order to follow the case up and he immediately furnished me with the name of the medical practitioner who had called him in consultation.

Owing to indisposition, I was unable to follow up the case at once although unwilling to waste time, and Dr. Feegrade very kindly offered to do this for me, and undertook to investigate possible connections between the patient and fowls. After interviewing Dr. Makuda in charge of the case he saw the patient, a Mahomedan lady, on June 6th and ascertained that she kept fowls. He examined these fowls and found a number of *Echidnophaga gallinacea* on them. This was very suggestive

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but I looked for some still closer connection, and asked Dr. Feegrade to see the patient again and enquire whether she had been keeping any of the fowls in her own room. He did so and was told that she had had four small chickens to which she was much devoted, and that she had been in the habit of carrying these young chicks against her breast.

Subsequent comparisons between fleas from her fowls and specimens removed from her breast by Col. Kelsall clinched the diagnosis. The fleas had passed from the chickens direct to her breast, where they had dug in, causing bleeding. It is interesting to note that the lady, when she was shown the fleas removed from her breast by Col. Kelsall, recognised their source and became so alarmed that without saying anything to the doctors she went straight home and sold the young chickens.

Regarding *Sarcopsylla* (*Echidnophaga*) *gallinacea*, Max. Braun writes "This flea is a native of Ceylon and North America. It lives on the fowl chiefly, attacking the neck and around the eyes. Specimens were sent me from Texas, where they not only attack poultry but also children, the latter somewhat severely. It also occurs on cats."

REFERENCE.

Braun, Max. *The Animal Parasites of Man*, English Edition, 1906, John Bale, Sons & Danielsson, Ltd., London, p. 406.

A CASE OF DOUBLE MONSTER (PARASITIC FŒTUS).

REMOVAL OF PARASITE, RECOVERY OF AUTOSITE.

By CAPTAIN D. D. KAPUR, M.B., B.S.,

Gujarkhana, Rawalpindi.

THE following case is of sufficient rarity to warrant publication:—

Karamat Hussain was born on the 27th January, 1927, in a village near Gujarkhana. Attached to him was a parasitic fœtus. He was brought to me on the 21st February, 1927, aged 26 days, for operation as the parasite was rapidly growing and becoming an encumbrance to the child. The parents were afraid that the life of the child would become very troublesome in that condition.

Family History.—The monster is the 5th child of its parents and has three sisters and one brother who are all alive, having good health and without any mental or bodily deformity. There is no history of abnormal delivery or of abortion. All deliveries, including that of the monster, were normal without any trouble to the mother. The parents are of good physique and possess very good health. The mother is aged about 35 years and the father is aged about 40 years. Both are alive.

Condition at the time of admission.—The child was lively, intelligent for its age, took milk normally, micturated from two male organs, one of autosite and one of the parasite, passed stools only from the anal orifice of the autosite. The autosite had well developed head, chest, abdomen, and both upper and lower extremities. It had a normal anal orifice. It had a male organ and a scrotum containing two testicles. The parasite had a well developed chest, abdomen and upper and lower extremities. The lower extremities were more developed than the upper. Each

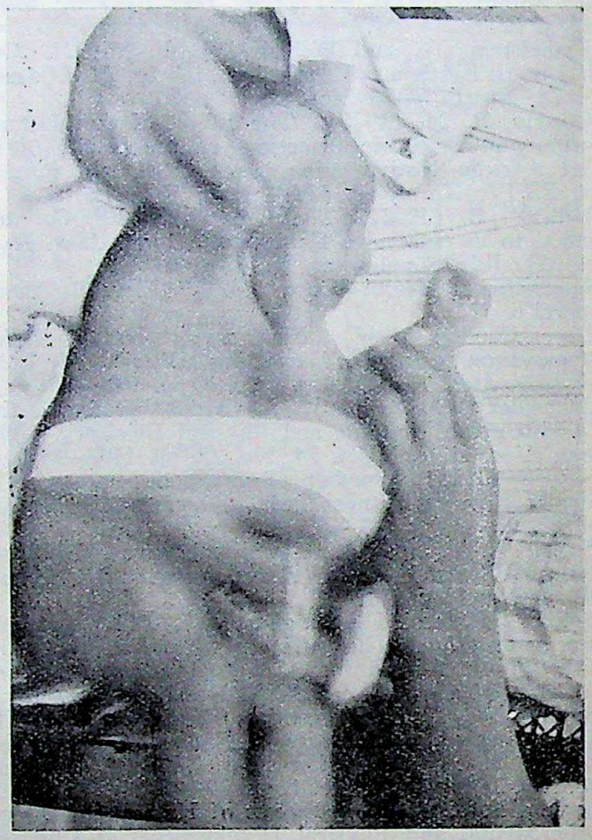

Fig. 1.—*Double monster* before operation.
A band of cloth is put round to keep the parasite in position as the child moved about. But owing to the constant movement of the child the photo has not come out nicely.
Weight = 81 lbs. Born on 27-1-27.
Operated on 21-2-27.

hand had two thick fingers and each foot had five well-developed toes. The chest was of stunted growth without lungs or heart. There were two marks, one on each side of chest at the side of the nipples. It had a male organ from which it micturated and a scrotum containing two testicles. It had no anal orifice but had a small depression to mark its place.

Both autosite and parasite were connected anteriorly with each other from about 1|3 of the sternum to about one inch above the umbilicus of the autosite.

The parasite had feelings for heat, cold and pin-pricks. It moved its legs and feet slightly

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when pricked with a pin. There was only one umbilicus for both autosite and parasite.

Weight of the monster	..	8 lbs.
Length of autosite	..	19½ inches.
Circumference of the head of autosite	..	15 inches.

I consider this double monster to be of the auto-parasitic order and of heterotypian-monocephalian type (according to the classification of Jellett).

Operation.—On 21st February, 1927, the child was given a dose of castor oil, and practically the whole of the surface of the parasite and the abdomen and chest of the autosite were cleansed and prepared for operation on the 22nd.

Fig. II.—*Autosite* (is living after operation).
Age at the time of operation, 26 days.
Weight after operation and removal of parasite, 7 lbs.
Born on 27-1-27.
Operated on 21-2-27.

The same morning a small soap and water enema was given and was repeated after two hours.

The child was operated on by me on the 22nd February, 1927, under chloroform. An incision was made all around at the junction of the parasite with the autosite. On opening the abdominal cavity it was found that the abdominal cavity of the autosite communicated freely with that of the parasite. The peritoneal covering of the intestines was continuous. The intestines of the parasite had a separate mesentery which was adherent to the posterior abdominal wall of the parasite. The intestines of the parasite were very thin and of rudimentary character with very fine lumen; they branched out from the intestines of the autosite and instead of ending at the anal orifice of the parasite—which was absent—they opened up and ended in the lower part of the intestines of the autosite.

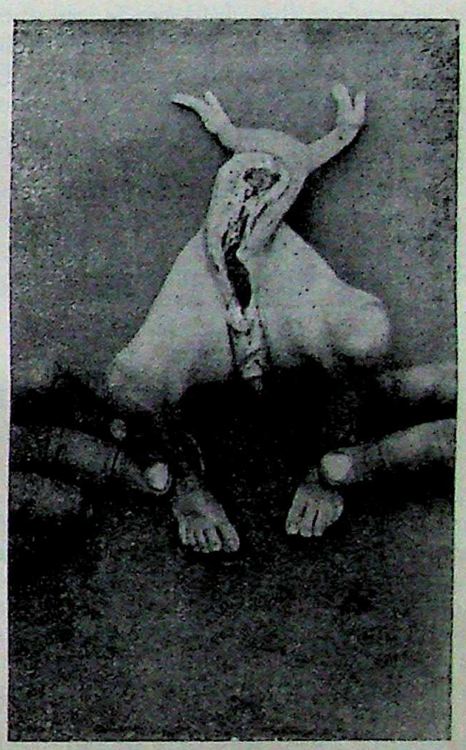

Fig. III.—*Parasite* after removal.
Weight = 1 lb.

There was thin gluey material in the intestines of the parasite. Large blood vessels and nerves ran into the extremities of the parasite from that of the autosite. There was one big kidney in the abdominal cavity of the parasite.

The blood vessels running into the parasite were ligatured and cut and the nerve trunks were cut short. The mesentery from the posterior abdominal wall of the parasite was shelled out without much difficulty, and the whole of the intestines with mesentery were transferred into the abdominal cavity of the autosite. To do this the kidney of the parasite had to be removed as it was in the way.

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To transfer the intestines of the parasite into the abdominal cavity of the autosite was a difficult task as there was not much room in it, but with a little patience I was finally able to transfer the whole lot into the abdominal cavity of the autosite. After examining the intestines of the parasite I decided not to remove these, but to transfer them into the abdominal cavity of the autosite considering that they would atrophy. This has probably happened, as no ill effects have as yet been noticed.

The abdominal cavity of the autosite was closed in the usual manner and the skin wound was closed with interrupted silk worm gut sutures; after the dressings were applied the patient was sent to the ward.

Weight after the operation.

1. Weight of the autosite—7 lbs.
2. Weight of the parasite—about 1 lb.

After operation the child made an uneventful recovery, except for the fact that a stitch at the lower end of the wound gave way. He was discharged cured and with the wound showing a firm scar on the 14th March, 1927. I again saw the child on the 22nd April, 1927, when he had grown fat, gained in weight and was very lively. On the 30th June, 1927, I received word from the child's parents that the child has developed normally and is both fit and well, and growing nicely.

A CASE OF RODENT ULCER CURED BY INJECTIONS OF SELENIUM.

By Captain R. P. GHOSH, M.B.,

Teacher of Surgery, Darbhanga Medical School and Deputy Superintendent, Banwari Lal Hospital, Laheriasarai, Darbhanga.

Bansi Das, male, aged about 45, was admitted to the Banwari Lal Hospital on the 24th June, 1927, for the treatment of a rodent ulcer on his face.

The history given was that it had started as a small, firm, red pimple a year previously. This enlarged, and six months later ulcerated. The patient attended a rural dispensary for six months, where the true diagnosis was not arrived at, and he was treated with yellow oxide ointment.

The ulcer was an irregular, oval one on the lower part of the outer canthus of the right eye. Its edges were slightly beaded; its base rather deep, indurated, and adherent to the bony margin of the orbit. It showed a few irregular feeble granulations, and almost one-third of the lower eyelid in its outer part had been lost. There was a very slight discharge present.

Finding the position of the growth most unsuitable for removal by operation, and our *x*-ray apparatus having gone to England for rewinding, I decided to try injections of "Collosal" selenium. After the third injection the ulcer showed signs of healing, and after the eighth injection there was no evidence of the previous ulcer except a depressed scar below the eye. The patient meantime received no other treatment except a continuance of the yellow oxide ointment. The preparation used was Crookes' "Collosal" selenium, ampoules of a 0·05 per cent. solution.

I showed the case to Major C. G. Howlett, I.M.S., our Superintendent, before and after the selenium treatment and he agreed with me as regards the diagnosis and proposed treatment. I am also indebted to him for his kind suggestion to publish these notes on the case; also to my House Surgeon, Dr. B. Chanda, for his assistance with the case.

A CASE OF CÆSARIAN SECTION FOR OSTEOMALACIA.

By P. P. GOPALA KRISHNA IYER,

Sub-Assistant Surgeon, Civil Hospital, Magwe, Burma.

Pullo, aged 32, Marwari Hindu female, was brought to the Civil Hospital, Magwe, on the evening of 17th April, 1927, for the treatment of difficult labour.

The patient was a multipara, having given birth normally to two healthy children previously,

Photograph of the patient at time of discharge.

the age of the last being 7 years. The woman, who stated that at the birth of her second child she had been a normally developed and well-proportioned person, on admission was found to

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be a hunchbacked cripple, standing barely 4 feet in height. She attributed her condition to a serious illness she had about this time. From her present condition and the extraordinary distortion of her pelvic bones and spine, she had evidently suffered from osteomalacia.

On examination it was found that she was full term, and the fœtus being unable to descend into the pelvis owing to its extreme narrowing, occupied the abdominal cavity, mainly above the umbilicus, displacing the heart and thoracic viscera. To add to all this, she suffered from chronic bronchial asthma. The vaginal outlet barely admitted the tips of two fingers, owing to the falling in of the bony parts. The fœtus was alive and since under the circumstances nothing but delivery by the abdominal route was possible, Cæsarian section was decided upon and the relatives of the patient informed. With their consent, the operation was immediately performed by the Civil Surgeon, the child (a healthy normally developed girl), placenta, and membranes being removed simultaneously. The operation was completed inside ten minutes. The patient made an uneventful recovery, the wound healing by first intention and the patient was discharged three weeks later.

Points of interest.

(1) The extraordinary result on the bony structures of an untreated condition of osteomalacia.

(2) The uneventful recovery, in spite of the cardiac and pulmonary complications following on the abnormal position of the fœtus throughout the period of gestation, to say nothing of the effects of chloroform during the operation.

It may be of interest to note that, owing to the position of the fœtus, the abdominal incision was perforce quite three parts supra-umbilical, while in making the uterine incision the surgeon first made an opening in the fundus large enough to admit the index finger, by means of which the placenta was located and rapidly removed from the proposed line of incision, which was then increased to the requisite length for the delivery of the child.

A photograph showing the mother and child who are both quite well is enclosed. The photograph shows to some extent, the crippled condition of the woman.

The operation was performed by my Civil Surgeon, Dr. C. A. Wells, I.M.D., to whom I am indebted for permission to publish these notes.

THE SERUM TREATMENT OF PLAGUE.

By R. D. PAL, M.B.,

Toungoo, Lower Burma.

The symptomatic and stimulant treatment of plague can at best only occupy a secondary place in the attempt to deal with the greatest scourge of the East.

Likewise treatment by antiseptics, after a short-lived period of glory, has passed into the limbo of lost causes. Just as fashions in tailoring come and go, so also various drugs become the rage of the season among doctors, and then pass into well-merited oblivion. Curiously enough, so long as their sponsors continue to sing their praises, a chorus of approval and appreciation pours in from all sides, but the moment that they go out of fashion, they cease to effect any more cures.

Time was when carbolic acid, mercury, urotropine, mercurochrome, iodine, acriflavine, and other lesser known antiseptics were lauded as new cures for plague, but now one rarely hears of them, except of their dangers and inefficiency.

Iodine latterly has been hailed as a cure-all for all sorts of conditions from asthma and bronchitis to plague, dysentery, gonorrhœa, and pneumonia. What mercury was to the ancients, that much and more iodine has become to the modern medical man. But even this latest favourite is fast becoming a fad, and its use in plague has been disappointing, except in the milder cases who would have recovered under any or no treatment.

There is a great variation in the severity of the disease, even during the course of the same seasonal outbreak. Usually, during the first half of the epidemic most of the cases end fatally, just as the death roll is heaviest among the vanguard troops. In the latter half it declines in virulence, and there is a tendency to spontaneous cures, and it is during this benign phase that most of the cures are effected by one or other of the "latest stunts," and the percentage of recoveries then works out very high.

The only line of treatment that has met with any consistent success in my hands has been by the use of antiplague serum, obtainable from the Pasteur Institute, Paris, or the Indo-French Drug Co., Bombay. Most of the failures of serum treatment are due to the very small dosage employed, and the fear of anaphylaxis which scares many a medical man from giving it intravenously.

I have been using the serum for the last three years, and the results have been most encouraging. I give from 40 to 60 c.c. *intravenously* in a single dose, and repeat this dose morning and evening till the temperature drops to normal. The temperature comes down by several degrees after each injection, and the patient feels a sense of well—being not obtainable with any other drug.

It is a waste of precious time giving the serum subcutaneously, and the injection of a large amount of fluid under the skin is likely to add to the patient's discomfort, if not actually to set up an abscess. In an acute infection where the condition is serious, the intravenous route is not only the safest but it is also imperative, and it would be criminal (except in young children and in those prone to serum reactions) to give it subcutaneously with its slower rate of absorption. I always have adrenalin solution and atropine

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sulphate by my side by way of combating the bogey of anaphylaxis which, we are told, in harrowing accounts reminiscent of the ghost of Hamlet's father, is ever present in any serum injection; and to give such an injection without having the adrenalin in a handy place, is deliberately to court disaster. To my mind the simple precaution of injecting a few c.c. subcutaneously and waiting a few minutes before giving the rest of the dose intravenously, would be sufficient to ensure against the risk of any untoward effect. Serum disease is a negligible discomfort, if indeed it occurs, and I have had no such trouble with any of my patients.

Adrenalin has been more used or rather abused in the treatment of plague, than of any other disease except asthma. It should be given subcutaneously or intramuscularly every 4 to 6 hours if the state of the pulse requires its use. The adrenalin solution (Parke, Davis & Co.) is a slightly acid solution, but I have known it prescribed orally with ammon. carb; in any case its oral administration is likely to be useless as it is destroyed by the gastric juice.

It is as well to add a little distilled water to the adrenalin in the syringe as this prevents the transient palpitation of the heart, and slight tremor of the body noticeable after a pure adrenalin injection. The dose of adrenalin required varies with the patient's condition, but usually ½ c.c. every 4 to 6 hours is sufficient.

Purgatives are best avoided, except at the very commencement, when five grains of calomel followed by saline six hours later will relieve the toxæmia.

The following is a good stimulant mixture—one ounce every 4 hours.

℞

Ammon. carb.	gr. v.
Digifortis	m. x.
Aqua chloroform	ad oz. i.

Caffeine citras, another drug widely used in plague, is not desirable as it is more likely to predispose to, or accentuate, cerebral excitement. Unlike caffeine, adrenalin causes a rise of blood pressure without producing any marked cerebral excitement.

Pituitrin may be combined with adrenalin, as its effect is more lasting, ¼ c.c. of each every 3 hours. It should, however, be given with caution to elderly people as it may precipitate an attack of apoplexy.

Local injections of iodine into the buboes are not helpful; I had a case where this procedure led to sloughing which became so extensive as to lead to gangrene of the whole thigh with fatal results.

Hot fomentations, and applications of iodex, or ichthyol and belladonna in glycerine will ease the pain. It is not much good trying to influence or arrest the progress of the disease by local treatment once it has become a systemic infection. When pus has formed it should be aspirated, and "Collosal" iodine run in, or a free incision made.

Morphia, the *bête-noir* of physicians, is of the greatest value in plague—⅛th grain combined with atropine sulphate 1|100th grain, and hyoscine hydrobromide gr. 1|100 subcutaneously. This dose is non-toxic, and by preventing restlessness and allowing of refreshing sleep saves the heart, and controls the troublesome diarrhœa which is quite a common feature.

Bromide and chloral mixture to effect its purpose has to be given in larger doses, and is likely to do more harm than morphia or hyoscine in small doses. But above all, absolute rest in bed is essential for a few days, even after the temperature has become normal. I have seen a patient drop down dead after complete recovery owing to the sudden effort of getting out of bed. Plain water should be given frequently and in sufficient quantity.

The use of the serum is unattended by any risks whatsoever and if given fairly early, in sufficient doses, and by the intravenous route, results comparable to those with the serum treatment of diphtheria or bacillary dysentery may be obtained even in severe and septicæmic cases.

SOME INTERESTING CASES AT THE WEST HOSPITAL, RAJKOT.

By J. F. HENRIQUES, L.M. & S., B.M.S.,
Medical Officer, West Hospital, Rajkot.

Case 1. *A case of abdominal tumour.*

A Hindu male adult was admitted on 15th November, 1926, with the following history. On 10th November, 1926, at 11 a.m. he got fever with rigors. The latter lasted for three hours. At 3 p.m. the same day he noticed a swelling in the left groin, which gradually increased in size and descended into his scrotum. Thereafter, he developed until his admission symptoms all resembling those of a strangulated hernia. He was immediately taken on as an emergency operation case. On proceeding with the usual operation for strangulated hernia, it was noticed that no bowel could be detected, but some mass. This was traced upwards by a longer incision. It was found to be a small dark tumour with a thick fibrotic pedicle going upwards into the abdomen almost into the spleen, but probably arising from the left kidney. It was extra-peritoneal. The origin could not be traced. The pedicle was ligatured, as high as possible, and removed with its adherent tumour. It was sent to the Haffkine Institute, Parel, and the following report received "The tissue consists chiefly of young connective tissue with fibrous fatty myxomatous character. Some blood vessels are also present and cysts containing blood. Some areas suggest young involuntary muscle tissue. There are no signs of malignancy."

Case 2. *A stone in the bladder with a vesico-vaginal fistula.*

A Mahomedan female aged 42 years was admitted for a vesico-vaginal fistula, the opening

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being of size a little short of a rupee. On vaginal examination it was found that there was no cervix visible. The following history was elicited. She had had uterine prolapse of two years duration, and she had amputated the mass herself by means of a razor. She did her usual house work that day and only took rest at intervals on account of the bleeding. The wound eventually partially healed and resulted in the vesico-vaginal fistula.

On sounding the bladder, it was found curiously enough that in spite of so large an opening a stone was within it. As a rule bladder stones are exceptional in females, yet in this case in spite of an opening nearly four times the size of the usual adult female urethral opening, a stone had formed. In fact the crushing of it took only a short time as four or five large bits came out easily through the opening and no more crushing was needed. A subsequent gynæcological operation was done and the woman discharged cured.

Case 3. A case of intestinal obstruction.

A Hindu adult female. The obstruction was due to a band of adhesions. On carrying out laparotomy it was found that there was a very large quantity of fluid, nearly 1½ pints, in the abdomen. This was the result of osmosis by the bowel after a number of saline purgatives given by practitioners before sending her on to hospital. It was thought at the time that the peritoneum might be infected, but she made an uneventful recovery.

Case 4. A case of foreign body in the vagina.

A practice prevailing in some parts is to introduce a bael fruit into the vagina for preventing a prolapse of the uterus, presumably on account of its astringent action or its round shape. The fruit in time dries up and becomes a hard rounded mass. In this case it had become dried, hard, and swollen. It could not be removed without chloroform anæsthesia. Under the latter it was finally removed by manipulation, but after much difficulty and in fact was brought out just as a lithotrite was about to be used for crushing it. The size of the dried fruit was just a little short of that of a tennis ball.

5. *Cases of cardiac or other dropsies, except renal.*

These are now treated at this hospital by injections every fourth day of Novasurol and it has been found a most useful drug, which cuts short the stay of patients in hospital considerably, curing them in much less time than other remedies. In renal dropsy the drug has to be given more carefully on account of its mercurial element. Paracentesis is done also when necessary.

Case 6. A case of uterine prolapse with pregnancy.

An adult Hindu woman, a multipara, had had a large partial prolapse of the uterus for 2 years. It was hardly credible from her history that she was five months pregnant, but the usual signs and symptoms were present, except that the uterus did not seem to have gone the usual height for a fifth month fœtus. The uterus could barely be felt abdominally.

Case 7. A case of concealed pregnancy.

An adult Hindu widow was admitted with the history that she had had a tumour for the previous five months and had not menstruated during this time. On vaginal examination it appeared that she was pregnant, but she strongly denied ever being so. She was, therefore, *x*-rayed and strange to say no confirmation of the fœtal bones being present was found. She was subsequently definitely found to be pregnant and also finally confessed to the fact.

Case 8. A case of difficult litholapaxy.

A Mahomedan aged 24 years had been suffering from stone in the bladder for one year. The usual operation—viz., litholapaxy—was performed, when it was noticed that the lithotrite seemed to get blocked at the neck of the bladder and could not be moved freely into it, presumably due to the stone blocking it. After repeated attempts, only a few fragments were nibbled off and that too by holding the lithotrite in an almost vertical position. As very little progress was being made and as it was felt that the mucous membrane was constantly getting in between the blades of the instrument, a suprapubic cystotomy was done. On exploring the interior with the finger, the following condition was found:—The stone was standing perpendicularly, free for about half an inch, and the other half enclosed in bladder tissue and embedded firmly in it. Many and repeated attempts to extract it with forceps or a scoop proved fruitless. It was then thought of incising the tissue in which the stone was embedded. One felt diffident in doing this, as it would perhaps mean tearing the bladder wall. So the following manœuvre was tried. An assistant was made to force the stone forwards by pressure from a finger in the rectum. This helped in getting the stone more forward and finally in being able to extract it, though it was done after having used a great amount of force. The shape of the stone was found to be very interesting. It was 1½″ in length, ½″ in diameter, and had a constriction in its middle. Just underneath the internal urethral opening was found a rounded narrow cavity, about 1″ in depth. Some of the crushed stone was found in it and scooped out with great difficulty. The following are two possible explanations.

(1) That the stone may have first formed in the prostate, and after it grew bigger, it projected into the bladder at the constricted portion; or (2) as is more probable, that it was a stone that had formed in trabeculæ of the bladder, i.e., just at the neck of it. This seems all the more plausible, as several other parts of the interior of the bladder had fragments firmly embedded within the rugæ, and these also had to be scooped off by the fingers and by irrigation. The case proved all the more interesting, as apart from the fact that it was unavoidably one

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of our very few cutting operations for stone, it was also a difficult one by any method. The weight of the stone was only 2 drs. The patient is now convalescent, but it is probably going to be a case that may have a recurrence, especially as the deep narrow cavity near the neck is still present.

Case 9. A case of large hydrocephalic head. A Hindu male child, aged 1 year, with a hydrocephalic head, the dimensions of which are as follows:—

Antero-posterior	21″
Bi-parietal	6″
Bi-temporal	12″
Circumference	30½″

The child's body is normally developed and there is no sign of rickets. The head seems to have been of normal size at birth, and increased in size normally (in proportion to its age) up to 10 months. Thereafter it very abruptly grew in size and continued doing so for the last two months, having now attained the above dimensions. There is no history of syphilis in either parent. The mother's age is 20. It is her first child, and the labour lasted only about 7 hours and was not a difficult one.

I am greatly indebted to Lt.-Col. J. R. J. Tyrrell, I.M.S., Residency Surgeon, Western India States Agency, for permission to publish the above cases.

NOTES ON TWO CASES OF ALASTRIM.

By Captain J. M. GHOSH, M.B. (Cal.), D.T.M. & H. (Cantab.), D.P.H. (Lond.),
Superintendent, Sadr Jail, Keonjhargarh, Balasore District.

The following two cases of what was apparently alastrim, which occurred recently in the Sadr Jail, Keonjhargarh, perhaps warrant publication. It may be mentioned that there were a few cases of small-pox in the locality at the time and that later one extramural convict contracted the disease and died of it. He had no access however to the two patients mentioned.

Case 1.—Dorsaina Dewri, Hindu male, aged 35, a Bhaniya by caste, engaged as a cook in intramural work for the previous six months, vaccinated, reported sick on the 2nd March 1927 with fever, headache, pain all over the body, and was admitted to the jail hospital. On the 4th his temperature was 102°F., with a thickly coated tongue, and pain in the loin and limbs. He looked flushed, and the bowels had not been opened for three days despite the usual routine dose of magnesium sulphate.

On the 5th March a few papules appeared on his face and upper extremities, the temperature dropped to normal, and he seemed quite comfortable. He was meantime segregated in one of the cells inside the enclosure.

The papules showed pustulation on the 9th day, and by about the 14th day all were pustular. In the meantime successive daily crops of pustules appeared, so much so that even on the 14th day a few new pustules could be detected. The eruptions were discrete and extremely numerous, except on the chest and abdomen where there were comparatively few. There was scarcely a pinpoint of space between contiguous spots.

The patient made an uneventful recovery and was discharged on the 15th April, 1927. Once his temperature had dropped to normal his only complaint was of a slight burning sensation when the pustules matured.

Points of interest in this case are as follows:—

(1) The very mild constitutional disturbance present.

(2) The successive crops of pustules coming out daily for fourteen days.

The patient was a healthy well-developed man who had never been outside the jail entrance for six months.

(3) There was no secondary fever, although the eruptions were extremely numerous.

Case 2.—Pratap Dewari, Hindu male, aged 42, Bhaniya by caste, engaged in the jail as a cook for the previous six years, was found to have a few scattered eruptions on the face—mostly papular, not very hard or shotty to the feel, some of them vaccinia-like—on the 7th April 1927, more than a month after the first patient had reported sick. He had not reported sick, but the condition was detected whilst he was distributing food to the other prisoners. On enquiry he said that he had been feeling feverish for the past three days. He was isolated, and further spots appeared the next day.

On the 9th April some of the spots showed pustulation. On the 10th, 10 c.c. of blood from patient No. 1 (citrated) was injected. On the 11th, he was quite comfortable but had a slight rise of temperature to 101°F. On the 12th, the eruption was rapidly drying up, and he had no further trouble. He was discharged cured on the 8th May 1927. He was not given a second injection of patient No. 1's blood, as he seemed to be doing sufficiently well, and owing to the difficulty in securing the blood from the first patient.

Points of interest in this case are as follows:

(1) He was also an (intramural) cook.

(2) There was no possibility, however, of his having come into contact with patient No. 1.

(3) There was no constitutional disturbance of any noticeable degree.

(4) The very rapid clearing up of the lesions after the injection of immune blood from patient No. 1.

Although the eruption was not as profuse in Case No. 2 as in Case No. 1, yet there were a good many lesions, and the soles and palms were particularly affected. Here, further, the eruptions were discrete, small, the size of a pea approximately, and came out in successive crops. I could not make out whether they were unilocular or multilocular. The rise of temperature after the blood injection appeared to be of a reactionary character, rather than a part of the primary disease.

Both patients were re-vaccinated during convalescence, and one took in two places inoculated, and the other only in one. I have never seen convalescent small-pox patients take vaccination, and doubt indeed whether they ever do so.

It would be of interest if other readers of the *Gazette* would record their experience with regard to the question of small-pox and alastrim; also whether treatment of the latter condition with the blood of convalescents has previously been tried. In small-pox and plague cases also, it might be worth while trying injections of the citrated blood of donors who had recently convalesced from the diseases concerned, or who had been protected by recent vaccination or by protective inoculation.

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Read this carefully. *Times of India.*

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Blenacrol A. F. D. to be used for douching in the proportion of 1 to 2 tablespoonfuls per pint of sterilised water.

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Indian Medical Gazette.

OCTOBER.

INDIAN PUBLIC HEALTH.

THIS month we publish a very important contribution on the sanitary policy of India. The author has made a special study of the subject, and his views are entitled to the most careful consideration.

The story of public health in India is one of splendid individual efforts, some of which succeeded in overcoming the prevailing inertia of those who were in authority, but these successes have been local and temporary.

All who have been competent to form an opinion on the subject have appealed for the formation of a well considered public health policy for India, but their appeals have met with little response. The subject of public health in India is difficult, unpleasant and unpopular. It has been avoided by administrators because they have realised that the problem bristles with complications, and the wise administrator is the one who prays "Give us peace in our time, O Lord."

The public health enthusiasts who have been too insistent in their demands for reform have always been regarded as troublesome fellows and have been treated accordingly. It is not surprising that there should be a pronounced reluctance on the part of administrators and sanitarians to grapple with the situation: why should they sacrifice their comfort and their future prospects in the interests of people who have shown no sign of dissatisfaction with the existing conditions? Before the Great War, Lord Roberts and every other military expert predicted that a time would come when Britain's army would be found utterly inadequate for the tasks which it would have to perform, but they failed to secure a hearing from the politicians. In the same way all those who are in a position to judge have expressed the opinion that there is an urgent need for an organised sanitary campaign in India, and they have been studiously ignored, just as Lord Roberts and his band of followers were.

Who is to blame for the failure to cope with the great emergency which exists in India? We cannot blame the Government, for there has never been any popular demand for action. We cannot blame the people who are so accustomed to their deplorable ill-health that they regard it as an inevitable evil. Nobody is to blame, and everybody is to blame.

We can imagine our readers growing impatient and asking "What is the use of harping on this subject when there is no prospect of anybody paying the slightest attention to you?" Perhaps they are right, but we are not sure that every administrator will continue to be so worldly wise as to shelve the question indefinitely. We are not so cynical as to deny the possibility of the existence of a sense of duty. We can readily imagine our present Viceroy grappling with the problem of preventable disease, just because he believes that it ought to be tackled. The subject is political, but, as our contributor suggests, it is political in the highest sense, and so is elevated above the plane of party politics.

The international aspect of the question should not be lost sight of; for just as the individual has to take his neighbours into account in connection with his mode of life, so each country nowadays must be prepared to give an account of its actions to the other countries of the world. Sooner or later we shall have to answer the question "What action have you taken to deal with the millions of preventable deaths which occur every year in India?" It will not be creditable if we have to reply that we regarded the problem as being insoluble, and that therefore we did not waste our time in trying to find a solution.

With those who say that they are sceptical of any solutions which have been suggested we have the fullest sympathy. No remedy has been proposed which can be warranted as safe and sure. We do not want somebody's vaunted specific; what we want is a consultation, followed by advice as to a sound line of treatment; in other words a thorough enquiry, and the formulation of a policy.

J. W. D. M.

OUR NOVEMBER 1927 ISSUE.

OWING to the Puja holidays in Calcutta from October 1st to October 11th, 1927, the issue of our number for November, 1927, is likely to be somewhat delayed, and we would ask subscribers, contributors and advertisers to note the fact. As, under these circumstances, our December number will probably not be out in time for the Congress of the Far Eastern Association of Tropical Medicine in Calcutta, December 5th to 10th, 1927, the November number will be made a special issue with reference to that Congress. It will include the second of Colonel Acton's articles on the common skin diseases of the tropics (seborrhœic dermatitis), illustrated with colour and half-tone plates on art paper; a valuable paper by Miss Margaret Balfour, O.B.E., M.D., on the causes of the maternal mortality in childbirth in India; a fully illustrated paper by Lieut.-Col. V. B. Green-Armytage on prolapsus uteri as a specially Indian problem; and one by Mr. R. Senior-White, Malaria Research Officer, Central Malaria Bureau, Government of India, on the problems of malaria in India, with special reference to Indian railways.

THE WOES OF AN EDITOR.

THE woes of an editor are—quite legitimately—a subject for mirth on the part of his readers. But, if we may be permitted to strike a personal note, we should

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like to bring the present position with regard to the *Indian Medical Gazette* to the notice of both our contributors and our readers. Men "at the periphery" often see more than those at head-quarters; they are often in a position to make useful suggestions, and we would welcome both suggestion and friendly criticism.

The Indian Medical Gazette first commenced publication in the year 1865 as a private venture of a civil surgeon of Darjeeling of that era, and was at that time a very small publication. Some time afterwards it was acquired by Messrs. Thacker, Spink and Co., the well-known firm of publishers in Calcutta, and the utmost credit is due to that firm for the many decades during which they have published this journal. In doing so they have materially assisted in the development of medical matters in this country, and this journal has been closely associated with many notable achievements in tropical medicine—Sir Ronald Ross' discovery of the mosquito transmission of malaria, and Colonel Henry Smith's work on cataract to mention but two. Under successive editors, such as the late Lieut.-Col. W. J. Buchanan, I.M.S., and the late Lieut.-Col. W. D. Sutherland, I.M.S.—one of its most brilliant editors—it has come to occupy the position of what we may perhaps be excused for claiming to be that of the premier clinical medical journal in India. It is perhaps not sufficiently realised by our readers that the *Indian Medical Gazette* is in no way a "service" journal; it has always done its utmost to refrain from entering into political quarrels in this country; even when such events affected the status of the Indian Medical Service, whose officers have always been amongst its chief contributors. Also that Messrs. Thacker, Spink and Co. are not only the publishers, but also the proprietors of this journal.

The editorial staff of the *Gazette* are not whole time; but have usually been—and at present are—medical men in official appointments, resident in Calcutta, who can give only their out-of-office hours to its editing. In the meantime the pressure upon its columns has grown greater and greater. In 1922 the office establishment was increased, extra provision made, and new ledgers, etc., introduced. This, we believe, led to a marked improvement in the journal and to a speeding up of correspondence, etc. Between 1922 and 1927 the number of pages devoted to text matter was increased, at first from 40 to 48 pages, then from 48 to 60 pages. In order still further to increase the amount of space available, the sections devoted to current topics, reviews, annual reports, correspondence, etc., were set in small type. For the moment this relieved the congestion.

But during the last two years the congestion has become more acute than ever. The plain fact of the matter is that this journal is at present receiving at least twice as much (acceptable) matter as it can publish within the space allotted. That its appeal to the medical profession in India and neighbouring countries is a strong one is shown by the fact that its subscription list has so increased that some 3,000 copies a month now go out to subscribers in India, and some 500 copies a month overseas.

The present position, however, is a very difficult one, and we would beg contributors whose articles are well worth accepting to exercise patience. With only a part time editorial staff, it takes one month to put a number together. After this, the number is one month in press before it is published. Hence normally an article accepted for publication cannot appear in print until the expiry of two to three months after it has been accepted. In passing we may mention that the editorial staff has nothing at all to do with the advertisement section of the *Gazette*; this is entirely in the hands of the publishers, though they do their utmost to keep this section strictly ethical and frequently consult the editors with regard to inclusion or non-inclusion of advertisements.

About half the subscribers to the *Gazette* are assistant and sub-assistant surgeons, who get the journal at concession rates, viz., Rs. 10 per year. In this connection we would like to point out to such would-be subscribers that in order to obtain the concession rate they must produce signed evidence from their superior officers that their salary is under a certain fixed sum per month, and that printed forms for such a certificate can be obtained from Messrs. Thacker, Spink and Co. In view of the fact that the journal is so largely taken in by the assistant and sub-assistant surgeon class in India, it seems impossible to enlarge the journal and to increase its rate of subscription. One has visions of a medical journal for India, run rather on the lines of the *Proceedings of the Royal Society of Medicine of Great Britain*, a publication which would cover all branches of tropical medicine, surgery, and public health, with sectional editors, and a simple title such as *Medicine, India*. But such a journal would be too costly for the particular class of subscriber to whom the *Gazette* is meant to appeal. An alternative is to publish two numbers a month, but this would severely tax both the editorial staff and the press. Another alternative would be to substitute for the *Gazette* two monthly journals, one devoted especially to original matter, and the other to clinical case reports and intended especially for the assistant and sub-assistant surgeon class of medical men in this country.

We can assure our readers that the present and very difficult position has received and is receiving the most sympathetic attention of the publishers. Even a mere increase of another 8 pages per issue would help materially; but there is a limit to such increases. A recent innovation which we have introduced has been the "Special Articles" section, following the editorial columns, to include articles which can perhaps hardly be classified as original articles, but which are well worth publishing and are chiefly of the nature of post-graduate lectures, etc. At first these were published in small print, but contributors objected so strongly to this that ordinary type has been resorted to.

Until some further move is made in the matter, we can only do our best to select such matter as will be of the greatest interest to our readers to the exclusion of all else, however interesting. And in the attempt to do so, we would beg our contributors to help us. Articles should be as succinct and brief as possible. If possible they should be typewritten, using double spacing or a wide margin; if close spacing be employed there is no space for corrections, and no alternative other than to re-write the entire article *de novo*. Indeed the number of articles which require to be entirely re-written is remarkable; recently a medical officer of good status sent us in an article which occupied nearly 15 columns. The subject matter in it was excellent, but the standard of authorship was deplorably low when one considers the author's qualifications, and there were a large number of tables, which had been very badly put together on paper of the flimsiest description (paper which it is not easy to handle under the punkah). There was nothing for it but to re-write the article in question entirely, as far as possible in the author's own language, a procedure which took eight hours of valuable time.

With regard to illustrations, temperature charts often present a special difficulty. Those usually sent in are on rather badly printed official forms, badly drawn, and with the lettering so small that on reduction for printing it is not legible. Wherever possible, temperature charts should be very clearly drawn in Indian ink on Bristol board or thick white paper, and the lettering inserted in rather large letters to allow of legibility when reduced. Photographs should be of good brown quality on P. O. P. paper. Skiagrams are sometimes difficult to reproduce, and where special features in such require emphasis it seems to us legitimate partly to re-touch them in order to bring out the salient points.

To a few of our best known contributors we would offer our most grateful thanks for the care which they expend on their manuscripts and illustrations. The article on plasmochin in malaria in our last issue is an admirable example of "how to do it;" the article is full of interest, most ably written, and very clearly typed; it only required to be read through, a few pencilled notes in the margin added to show the printer where to use small type, and was ready to go to press immediately.

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We trust that the fact that this editorial note is published in small type will not be taken by our readers as an indication that we attach but little importance to it. It is due to the ever-present necessity for compression. Our chief reason for thus appealing to our readers and contributors is to ask the former to make suggestions, and the latter to exercise patience.

SPECIAL ARTICLE.

THE NEED FOR A PUBLIC HEALTH POLICY FOR INDIA.

(*From a special correspondent.*)*

In 1925 the All-India Conference of Medical Research Workers sitting at Calcutta passed the following resolutions:—

I.—"That this Conference recognises—

(*a*) the paramount importance of sound fundamental legislation in the application of medical knowledge for the people's benefit;

(*b*) that there are grave defects in the present laws, both Imperial and Local, which act as obstacles to this beneficial application;

(*c*) that in any revision or reconsideration of the Government of India Act (e.g., in 1929) the question of public health legislation in regard to central legislation, co-ordinative legislation and local government (provincial) legislation, should receive serious and detailed consideration.

II.—"That this Conference believes that the average number of deaths resulting every year in India from preventable disease is about five to six millions; that the average number of days lost to labour by each person in India from preventable disease is not less than a fortnight to three weeks in each year; that the percentage loss of efficiency of the average person in India from preventable malnutrition and disease is not less than twenty per cent.; and that the percentage of infants born in India who reach a wage earning age is about 50 per cent., whereas it is quite possible to raise this percentage to 80 to 90 per cent.

The Conference believes that these estimates are under statements rather than exaggerations; but, allowing for the greatest possible margin of error, it is absolutely certain that the wastage of life and efficiency which result from preventable disease costs India several hundreds of crores of rupees each year. Added to this is the great suffering which affects many millions of people every year.

This Conference believes that it is possible to prevent a great proportion of this waste at a cost which is small in comparison with the expenditure which would be saved.

The recent census shows that the position in India is one of grave emergency. The Conference recognises that the problem is very complicated and involves not merely medical research, but also questions of public health, medical relief, medical education, propaganda, and social and economic considerations.

The Conference strongly urges on Government the immediate necessity for appointing a strong Commission, chiefly non-technical, for the purpose of making a thorough enquiry into the wastage of life and the economic depression in India which result from causes which are capable of being remedied.

The Conference believes that the greatest cause of poverty and financial stringency in India is loss of efficiency resulting from preventable disease, and therefore considers that lack of funds —far from being a reason for postponing such an enquiry—is a strong reason for immediate investigation of the question."

The second resolution was adopted unanimously at all the four conferences of medical research workers which have been held in Calcutta.

Subsequently, these resolutions were submitted to the Government of India (Department of Education, Health and Lands). What opinions may have been expressed or what action may have been taken, if any, by the Government of India are not known, but we understand that the Royal Commission recently considered the agricultural, social and economic conditions of the Indian people in relation to disease and public health conditions in India.*

The two resolutions quoted above are an expression of medical opinion in India of its belief in the close relationship between the economic condition of India and the health of its people, and that the system of Government and the laws enacted in India or any country have a very close and intimate relationship with public health. In other words "politics," in its widest and best sense, includes as an integral part the health conditions of a people.

To many the word "politics" merely refers to questions of franchise, representation and forms of Government. It is our belief that this narrowness of vision has characterised Indian "politics" for many years, that it still obtains widely, and that unless corrected it will dominate future views and action, so that the opportunity to advance the cause of public health and sanitation may be lost. It is our purpose to show that in Indian public health administration there has been no continuity of policy, no long views, but a series of abrupt actions, dictated sometimes by the feeling that something had to be done, sometimes by the view that the people were not ready,

*We are not in the habit of publishing articles sent in by anonymous contributors; but, in this instance, we consider the article so important, and by so distinguished an authority on the subject, that the Editor has accepted it for publication.—Asst. Ed., *I. M. G.*

*The first volume of evidence has just been published and the memorandum and evidence submitted by Lieut.-Col. Graham, I.M.S., Public Health Commissioner with the Government of India is of very great interest and importance. This was received late.

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and sometimes by fears lest one department should acquire too much control and too much independence. The most abrupt action was probably that taken in 1919. The Government of India in 1914 had stated that "the general direction of a policy of public health *must* remain with the Central Government," but in 1919, without a murmur or apparently without remembrance of this previous pronouncement, they handed over public health, policy and all, to the care of provincial governments. Perhaps they were right, but the fact is mentioned to illustrate the vacillations, the quick changes of views, the sudden and precipitate actions, that have characterised public health policy and action in India in the past. We wish to show that these alterations of calm and hurry, of inaction, advance and retreat, have at any rate not improved the chances of bettering public health and sanitation in India. Public health reform is usually a matter of gradual evolution, but history elsewhere has shown that its progress, even when slow, can be guided and stimulated by a study of the principles of its growth, and by an application of this knowledge.

In the construction of constitutional reform in India, British administration has followed very much the same course. The following quotation from Sir Frederick Whyte's book "India—A Federation" is illuminating. "Neither the Decentralisation Commission of 1907 nor the Montague-Chelmsford Report, nor the Report of the Joint Parliamentary Committee, nor the Despatches of the Secretary of State and of the Government of India on Indian Consitutional Reform, when the present Act was on the anvil, penetrated behind the political or administrative problems of the moment to those ultimate constitutional principles without which no satisfactory instrument of government can be made. The Englishman's refusal to build a bridge until he actually comes to the river bank is responsible for the elasticity of the British Constitution, but it entails certain risks in any country where the constitution can only exist in the form of the written word of a Statute." As pointed out in an earlier chapter, "*the Government of India has at all events until recent times chiefly concerned itself with administration,* and its pre-occupation with this function has veiled from its eyes the fact that since the Crown took over sovereign responsibility for India in 1858, a constitutional problem of the first magnitude has been slowly incubating and has now reached a stage where a firm grasp of constitutional principle is the only security against costly errors. I do not know whether Mr. Lionel Curtis when he conceived the ingenious device of the Transferred Subjects realised that their administration would be the occasion for a study of Federalism; but it is quite clear that neither he nor those who accepted his design succeeded in defining either what they themselves intended or what the experiment of the Transferred Subjects might entail." The words in italics probably contain the gist of the matter. The Government of India has been so busy with administration that it has not had much time or attention for anything else. Public health has been allowed to develop by itself or to stagnate, though every now and then immediate urgency or twinges of conscience have resulted in spasmodic action. But the "ultimate principles" of sound advance in public health have either not been studied, or they have been mostly ignored and set aside. India has lacked an Edwin Chadwick or a John Simon.

What has been the history of sanitation in India? For the ordinary reader, there are two short sources giving most of the salient points. These are, *Indian Sanitary Policy,* issued by the Government of India in 1914, and *Sanitation in Politics* by Col. W. King, C.I.E., I.M.S., retired, (*Science Progress,* Vol. XVIII). The former is an excellent resumé of the happenings since 1859. It gives us a clear and concise statement of what has been achieved by scientific medicine in India. It gives reasons why certain actions were taken, and enunciates the sanitary policy of the Government of India, both in its own capacity and *vis-a-vis* local Governments. It is an orderly document, clearly and well written, and if nowhere very enthusiastic, it assures us that a great deal has been done in the past, that a great deal is going on in the present, and that there are hopes of a great deal in the future.

Colonel King's article is different in tone and much more piquant in style. In the freedom of retirement he says things which no doubt he wished he could have said while in harness. Admitting all that medicine in the larger sense has done for India, he views with disappointment the great opportunities that have been lost. The true sanitarian in the past in India has been baulked of success largely by the official mind, with its desire for equanimity; with its obsession that "education" of a comparatively small class is the only road to advancement of any sort; with its desire to keep the balance between knowledge and superstition, and between opposed religious susceptibilities. It illustrates what Sir Malcolm Morris has termed the "secretarial mind." Talking of the Poor Law Guardians Sir Malcolm says "Although it had had to do so largely with affairs of medical technic, for a long time it had had no medical men on its staff. It had proceeded on the assumption that for the Board's ordinary medical business the common-sense of secretaries and other non-medical officials was sufficient: when some occasion out of the ordinary arose, special medical assistance could be requisitioned. This curious faith in the omniscience of the secretarial mind had had disastrous results upon the health interests of the poor, and at last, not long before the Board received its apotheosis and became the Local Government Board, a Medical Officer was appointed; but even then it was not expected that he should give his superiors general advice, still less that he should display initiative. Like a child brought up under the old method, he was only to speak when spoken to." But most of all does Colonel King condemn those of his

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own service in authority who could brook no loss of their power, who feared to see slipping from their grasp a branch of the medical service destined to grow and endure. Important schemes, promising and almost assured of success, were curtailed, pigeon-holed or rendered nugatory because these officers were jealous that junior officers were in a position to give independent advice to Government on important medical matters.

In 1859, the heavy mortality of the troops in India aroused attention in England. A Royal Commission was sent to India and reported in 1863. The mortality was indeed appalling.

In the European army the death-rate was 69 per 1,000.

In the Indian army the death-rate was 20 per 1,000.

Among European Officers the death-rate was 38 per 1,000.

The fact that in 1914 the mortality rates in the European and Indian army respectively had been reduced to 4·36 and 4·39, shows what can be done by systematic and long continued practical application of sanitary principles and knowledge in a controlled community. The Sanitary Commissions appointed for the provinces of Madras, Bengal and Bombay did important work. Sir John Strachey in Bengal proposed the creation of a local public agency all over the province, in definite relation to an organised public health department of Government. Had it been possible to put the proposals into execution, the sanitary history of the province might have been profoundly altered. As it was, Government decided that the path to health lay through elementary education; and the usual compromise was affected. A sanitary commissioner was appointed, but no sanitary department; the civil surgeon was appointed *ex-officio* district health officer, with duties which his other work has never allowed him to perform. In Madras, similar proposals were made for forming public health services for municipal and district board areas. The Madras Commission indeed took active steps in general sanitary matters, but the Madras Government considered the pace too fast, and followed the example of Bengal in putting general education in the forefront. As Colonel King says "graduates multiplied, but the primary education of women and children was never undertaken." This education obsession has come down to the present day.

In 1868, the Sanitary Commissions were cut down to one member, and in 1869 they were practically abolished, the one remaining member being replaced by a sanitary commissioner. From then onwards there has been a consistent effort made by those in high administrative authority in the medical department to subordinate the Sanitary Commissioners to the Surgeon-Generals in the provinces. From 1869 to 1886 the Sanitary Commissioner held the rank of Deputy Surgeon-General; in 1886 this rank was reduced to that of Major or Lieutenant-Colonel, and in 1896 the Surgeon-General with the Government of India said that Captains under the Surgeon-Generals of Provinces were quite sufficient. Most provinces, however, refused this proposal. In 1911 the head of the Indian Medical Service endeavoured to abolish the post of Sanitary Commissioner with the Government of India, but failing in this he managed to get the latter official directly subordinated to himself. Later this same proposal for abolition was made by the Inchcape Committee. Fluctuations this way and that way have gone on. Every retrenchment committee has been taken advantage of to try to get Public Health under the control of the Medical Department. In some provinces this has been done, e.g., in Assam. In Assam the Director of Public Health is subordinate to the Inspector-General of Civil Hospitals, and the Public Health Department in that province is mostly engaged in arranging for the treatment of kala-azar at a cost of Rs. 2 lakhs per annum. It is well known that the Inchcape Committee proposed to abolish the Sanitary Commissioner with the Government of India. These facts are mentioned to illustrate the shifting or shifty policy of those in authority towards the development of public health, and it is not surprising that little of permanent value should have accrued where jealousy and antagonism have existed for so many years.

The impossibility of grafting a permanent public health service on to a civil medical service, which if efficient is already too much occupied with its own legitimate business to undertake others and which is liable to constant changes of personnel, seems so obvious that it is surprising that it should still be seriously considered. In 1906 and the succeeding years the ravages of plague acted as a stimulus both to the Government of India and to the communities affected. The report of the Plague Commission awakened the Government of India to a sense of its responsibilities. The post of Sanitary Commissioner with the Government of India was created. His duties were to settle with Local Governments the principles of advance, and to organise and direct research throughout India, and to advise the the Government of India on sanitary questions.

The resolution on *Indian Sanitary Policy*, 1914 of the Government of India states that "this arrangement was not completely successful," but Colonel King interprets the readjustments that were made in 1912 in the Sanitary Commissioner's duties as an attempt on the part of the head of the medical service, first to abolish the post altogether, and secondly to curtail his powers and its usefulness. In 1912, however, a very important resolution on provincial sanitation was issued by the Government of India. By this the number of Deputy Sanitary Commissioners was increased by 12, and a promise was made for the financing of Health Officers and trained sanitary inspectors for municipalities. Civil Surgeons remained as

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the sanitary advisers in districts. Before this many recommendations and proposals for establishing a Public Health Service in India had been made. In 1894 the first Indian Medical Congress proposed a Health Ministry and a unified public health service throughout India. In 1904 the Governor of Bengal urged the same. In 1905 the College of Physicians repeated these recommendations. In 1907 the Secretary of State enquired what was being done about it. It must be acknowledged that the 1912 resolution and proposals were a distinct if tardy advance in practical public health policy and laid the foundations of progress and action. To Colonel King belongs the credit of initiating a public health service. In 1894 he had secured in Madras the compulsory employment by all local bodies of none but trained sanitary inspectors. From 1912 to 1919 sanitary progress, alike in policy, development, and activity has been marked by desultory advances here and there; while municipal sanitation remains on the whole, save in exceptional instances, in a backward condition. The reasons given are poverty of funds, the apathy of the people, unwillingness on the part of municipalities to appoint and make use of sanitary officers, the unsatisfactory state of the law, resulting in lack of real responsibility of local bodies, and little or no relationship between them and the public health department. The Government of India has on various occasions expressed the hope that sanitary advances in rural districts would spread by some sort of healthy contagion from municipal example, and that therefore municipalities should be the first to be provided with sanitary staffs. When it is remembered that 90 per cent. or more of the population of India is rural, it is evident that such a hope was simply a pious one, and a temporary escape from a serious and difficult problem. The development of a rural health organisation has been left to local governments, who have each in their own way made attempts at solution. Bengal in 1914 by its Sanitary Officers' Act adapted existing Acts to create a district sanitary staff, and each district is now compelled to employ a health officer. This service, as well as the health officer service of municipalities, is not provincialised, though Government pays half the salaries. This district health service is obviously inadequate, and this year (1927) it has been augmented by the addition of a sanitary inspector or a sub-assistant surgeon health officer in each thana, of which there are some 600 in Bengal. Other provinces have gone in mostly for provincialised services of district and municipal health officers. Madras and the United Provinces, for instance, have district health officers under the control of the Director of Public Health, while the municipal Health Officers of Bihar and Orissa are also members of a provincial health service. The growth of such rural health services is very properly a local matter, though co-ordinating help through a common source might have helped.

From 1911 to 1919 much was accomplished in the field of research and investigation. Since its inception in 1911 the Indian Research Fund Association has initiated many investigations of first class importance in tropical disease. The work on malaria, cholera, kala-azar, plague, rabies, and many other subjects has been of very great value in advancing not only knowledge and treatment, but also sanitary progress. We think that the Government of India made a mistake in making the Calcutta School of Tropical Medicine and Hygiene a provincial institution. Research is essentially a central subject to be carefully fostered and nourished. The need for a central government hygiene institute has now become paramount and we hope that such an institution, put alongside the Calcutta School of Tropical Medicine, will be the result of a correct appreciation of the present situation by the Government of India.

On August 20th, 1917, the Secretary of State for India in the House of Commons made what he himself described as "the most momentous utterance ever made in India's history," viz., "that the policy of Government was the development of self-governing institutions with a view to the progressive realisation of responsible government in India as an integral part of the Empire." As is well known, this was followed by the visit of the Secretary of State to India, the publication of the Montague-Chelmsford Report, the passing of the Government of India Act, 1919, and the Devolution Rules under Sections 19 and 45A of that Act. The principle of dyarchy was established, by which certain subjects were provincialised and handed over to the authority of provincial governments, the Central Government divesting itself of all responsibility and authority in these subjects. Of these provincialised subjects, Public Health was one. Any co-ordinating influences in sanitation, such as there had been either in principle, precept, or practice, went by the board. It is not inferred that the Central Government actions in these respects had always been valuable or far-sighted, but there had been sufficient evidence that such an influence could be exerted for good; and now all such possibility was suddenly voluntarily surrendered. Had this been done after consideration, deliberation and discussion, there might have been less cause for apprehension; but if the measure was hasty and experimental in other respects, it certainly was so in the case of public health. This has been in some measure due to public health being classed as a "subject," like "jails" or "taxation," instead of realising that it is one of the most fundamental factors in the development and evolution of the human herd.

An insecure hold of life and the dread of the frequent and apparently inevitable calamitous visitations of death-dealing diseases have been the chief factors producing the fatalistic outlook on life which is the despair of every reformer in the East. The politician should know this, and should understand how integral a part is health in the political growth of a people; that a public

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health policy is not promulgated simply in the provision of hastily assembled staffs for the suppression of epidemic disease on its appearance. Nowhere in the Montague-Chelmsford Report, the Government of India Act, nor in the Devolution Rules is there any evidence of a real appreciation of public health matters. The Report, lengthy and discursive as it is mentions public health only in an appendix as a subject suitable for provincialisation. If, as Sir Frederick White affirms, "when the 1919 Act was on the anvil, neither the Decentralisation Commission of 1907, nor the Montague-Chelmsford Report, nor the Despatches of the Secretary of State and of the Government of India on constitutional reform, penetrated behind the political or administrative problem of the moment to these ultimate constitutional principles of government," it is less surprising that the appreciation of the place of public health and public health policy in the political life of the people should have been missed.

What has been the result of the Reform Act of 1919 on the public health of India? It is a little difficult to say. Hardly was the Act set in motion, when it was proposed to sacrifice the post of the Sanitary Commissioner with the Government of India on the altar of economy, on the grounds that now that Public Health had become a provincial subject there could be nothing for that officer to do, or rather nothing that the head of the medical service could not very easily do himself. And, but for the protestations of the British Medical Association and the press in England, the thing would have happened. The present holder of the appointment has brilliantly shown that, despite some loss of administrative duties in India itself, there has been enough work and more than enough in the international sanitary and public health relations of India alone, for one who has a thorough knowledge of public health problems and in addition a forceful personality. For Public Health demands of those who would understand it much study and thought, it touches the life of the individual, the community and the nation far more intimately and fundamentally than any branch of curative medicine, no matter how beneficial. What India has lost therefore, the larger India has gained. In the provinces themselves it is difficult in such a short period to estimate progress. There has been no great fall anywhere in death-rates (were this indeed the real way to measure sanitary advance); epidemic disease has waxed and waned in its usual way. The happenings and doings in one province are often unknown to its next neighbour, except in rather belated annual reports. Information of the sanitary happenings in other provinces is gleaned more quickly from the newspapers than from any other source. The League of Nations official at Singapore or Geneva has probably a quicker perspective of epidemic disease than the provincial sanitary official in India. The other day (28th May) it was desired to get information about recent happenings in cholera in other parts of India, for the benefit of certain research workers in Calcutta. No information later than that of the 16th of April was available. And such information, late as it is, is given and received more by custom than by any regulations or necessity. In short, there are few or no precautions of any sort taken now to prevent the spread of infectious diseases from one province of India to another. The twelve-yearly Kumba *Mela* was recently held at Hardwar. On previous occasions this *mela* has spread cholera in devastating form, and in the present instance everything that was done, apart from the sanitary precautions at the fair itself, was done at the instigation of the Viceroy, who had probably been impressed with Sir Leonard Rogers' paper on the subject. The development of health organisations has gone on presumably since 1919 in various provinces, but it has done so in a somewhat hesitating and uncertain manner. As Madras led the way in the provision of trained sanitary inspectors, so Bengal probably did so in the appointment of District Health Officers in all its districts. Experiments have been tried in other provinces, but there has been no bold line of advance on uniform lines. Uniformity indeed is not necessary nor perhaps desirable here, but some co-ordination or some common meeting place for discussion would certainly be helpful. That the present Sanitary Commissioner with the Government of India holds similar views is seen from the following extract from his Annual Report for 1924. Talking of tuberculosis, he says "If the co-ordination which had been begun to be exerted before the Reforms Act had been continued, it is probable that more progress would have resulted."

† Under the present system there is little or no place for co-ordination. In pre-reform days three important sanitary congresses were held at Lucknow, Madras and Bombay and their transactions still make profitable reading. A fourth

† The evidence of the officers serving under the Government of India before the Royal Commission on Agriculture in India has just become available.

The spirit of co-ordination between the Central Government and provincial governments was taken up by several of the members of the Commission, and Colonel Graham in his answers stated the present position clearly. In his oral evidence (p. 1324) he states that in his opinion "the Central Government must not be afraid to lay down what they consider a fair line of policy for the whole country, which may be developed by individual provinces in any way they wish." He states further that the main avenue of approach to provincial governments in health affairs is by demi-official correspondence with the Directors of Public Health and by requesting the Department of Education, Health and Lands to address the Local Government. "In epidemic diseases in certain circumstances the Central Government can step in and lay down a definite law to Provinces." But it is not clear from the Devolution Rules what the particular circumstances are. The general impression conveyed is that further co-ordination is very desirable. The subject was not fully discussed, as the terms of reference of the Commission state that "it is not within the scope of the Commission's duties to make recommendations regarding the existing division of functions between the Government of India and the Local Governments."

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we believe was proposed, but when the suggestion went to the Secretary it was not enthusiastically received, because as the secretariat note said "some of the resolutions of previous conferences had proved distinctly embarrassing to the Government of India."

Since 1919 there has been very little legislation of primary importance in regard to public health, either in the legislative assembly or in provincial legislatures. The Calcutta Municipal Act of 1923 is probably the most important. This imposes definite sanitary obligations on the Corporation and gives it wide powers in health matters. But the fashion of devolution here as elsewhere has gone far, and in sanitary matters the Corporation is very independent of any government control. Bengal has led the way in food adulteration legislation, though Madras and most other provinces have Acts, but no machinery for exercising them. Every province probably agrees that the present provincial public health legislation is unsatisfactory. Sanitary ordinances are scattered throughout many Acts and are a mixture of permissive and compulsory enactments, mostly the former. The regulations between the Local Government and local bodies in health matters are in the main ill-defined and nebulous. Responsibility is divided. With the spirit of the times, local bodies are apt to resent government interference in any form, while local governments hesitate to adopt coercive measures, of the legality or desirability of which they are themselves dubious. There is undoubtedly a great field for provincial activity and it is debatable how far any central co-ordination or advice would be necessary or helpful. At present there is little or none, and provincial legislatures are quite untrammelled in this respect. What then has been the effect of the Reforms Act in public health?

Our short review has shown that there has been a very satisfactory development and widening of India's international sanitary relations, while in provincial sanitary matters the provincial legislatures have on the one hand had an opportunity to act unfettered by any central guidance or control, on the other there is the danger that such action may be disjointed and unequal; further, there is no real control over the spread of general epidemics in India.

The Reforms Act introduced no new guiding principle in public health, and apparently the newly found freedom has not yet acted as a stimulus for any definite action, but it is perhaps too early to pronounce on this. What of the future? It is this aspect which is so important; the present position is experimental, and in 1929 a Royal Commission will examine the progress made under the Reforms Act, and advise Parliament what further steps should be taken in developing local self-governing institutions. If we may take the Commissons that have been already held as any indication, the task of the new Royal Commission will be a very difficult one. Our fear is that public health considerations may again be completely lost sight of in the discussion on constitutional procedure, principles of government, financial matters, mixed and communal representation, etc., etc., that are bound to occupy much of the Commission's time. And the truth is that public health is so intimately bound up with the people's welfare and with "politics" that it should occupy a foremost place in the discussions and deliberations. It should be a determining factor in future parliamentary legislation, and should receive due prominence in the Act which will follow the present one. Just as the idea and principles of preventive medicine should be in and behind all teaching in the medical curriculum, so should considerations of public health permeate all fundamental legislation and receive a definite place; and pronouncements on it should be clear, definite and certain. The present trend of Indian governance is toward a federation, and a useful discussion on the subject is found in Sir Frederick Whyte's *India, a Federation,* while the Reforms Enquiry Committee's report (Muddiman Committee) should also be consulted. In the Majority Report this committee emphasises the fact that "a much clearer definition and a much closer examination of the relations between the Central and Local Governments would be an essential preliminary to any scheme of provincial autonomy in India."

If this is true for general relations, how much truer is it of relations regulating sanitary policy and general public health matters in India. The Minority Report states "We recognise that it is impossible to dispense with the Central Government. The Central Government will perhaps be the most potent unifying factor between province and province, and we think that it will be charged with the vital responsibility of securing national safety." And we might also add "and national health."

We have already quoted salient passages from Sir Frederick Whyte's monograph, and we would refer the reader to it and especially to the description of the various federal states. "The Indian constitution has developed almost accidentally, going now fast now slow according to the vicissitudes of recurring critical moments in modern Indian history," and public health has grown in similar fashion and will continue to develop *pari passu* with the growth of the Indian constitution. How important it is then to realise that when great changes take place in the constitution, public health policy is likely also to undergo great changes, and to see that those who play the greatest part in making these changes should realise this also.

A passing acquaintance with federal institutions as they exist in various parts of the world is interesting and important, especially the relationship in public health between the central or federal government and the individual state and between the states themselves. Take the U. S. A. and the Union of South Africa as examples. The Union of South Africa Public Health Act

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1919, Section 2, creates " for the Union a department, to be known as the Department of Public Health, which shall be under the control of a Minister and in respect of which there shall be a portfolio of Public Health." The next section admirably defines the functions of the new department in the following words:—" The functions of the Department of Public Health shall, subject to the provisions of this Act, be to prevent or guard against the introduction of infectious disease into the Union from outside; to promote the public health and the prevention, limitation or suppression of infectious, communicable or preventable diseases within the Union; to advise and assist provincial administrations and local authorities in regard to matters affecting the public health; to promote or carry out researches and investigations in connection with the prevention or treatment of human diseases; to prepare and publish reports and statistical or other information relative to the public health, and generally to carry out in accordance with directions the powers and duties in relation to the public health conferred or imposed on the Governor-General or the Minister by this Act or otherwise.

It shall be the duty of the department to obtain and publish periodically such information regarding infectious disease and other health matters in the Union, and such procurable information regarding epidemic disease in territories adjacent to the Union or in other countries, as the interests of the public health may require."

Apart from the general supervision and very thorough control over all matters pertaining to public health, which other provisions of this Act enable the Minister to exercise, the duty of the Department of Public Health in South Africa is to advise and assist local bodies, to conduct research, to compile statistics and, by their publication, to educate and guide the local authorities and public opinion generally. The Minister is given wide powers to make regulations, he may supersede local bodies, he may require them to do specific things, e.g., to compel persons to undergo inspection with a view to vaccination or re-vaccination, and he may even exercise executive powers, e.g., procure the examination by a medical practitioner of any person residing in any area where he believes venereal disease to be prevalent. This recent statute, in fact, gives prominence in almost every provision to the principle of direct State responsibility for public health, while at the same time it confers ample powers on local authorities.

The federal system of the United States is probably the most decentralised, Sir Federick Whyte says " Criminal law, public health, sanitation and cognate matters presuming the exercise of police powers in administration, are usually federal subjects, the United States being the most signal instance of provincial control over them." Despite this the United States Federal Department of Public Health is a powerful agent. It is a bureau in the Treasury Department with a commissioned medical corps and other experts. Its duties broadly speaking are (1) The protection of the United States from the introduction of disease from without and the prevention of interstate spread, the suppression of epidemics, the investigation of disease and the dissemination of health information. It also supervises the manufacture of biological products, and co-operates generally with state and local health departments in assisting and giving advice in health matters. The accomplishments of the public health service are many and various. It is an admirable example of governmental usefulness." (Rosenau, *Preventive Medicine*, 1927).

The history of the Public Health Service of the Dominion of Canada illustrates typically the development of a federal organisation. The earlier health organisations, like those elsewhere, were formed by the stimulus of fear of epidemic disease (cholera and typhus). In 1847, 98,706 immigrants passed through the port of Quebec, of whom 5,434 died of typhus.

From the passing of the British North America Act, 1887, the history of Canadian Public Health development followed along federal and provincial lines. In 1919 the federal health duties were consolidated in a Ministry of Health, whose duties are as follows:—(Fitzgerald, *Preventive Medicine*).

" The duties and powers of the Minister administering the Department of Health shall extend to and include all matters and questions relating to the promotion or preservation of the health of the people of Canada over which the Parliament of Canada has jurisdiction; and, without restricting the generality of the foregoing, particularly the following matters and subjects:—

(*a*) Co-operation with the provincial, territorial, and other health authorities with a view to the co-ordination of the efforts proposed or made for preserving and improving the public health, the conservation of child-life and the promotion of child welfare;

(*b*) The establishment and maintenance of a national laboratory for public health and research work;

(*c*) The inspection and medical care of immigrants and seamen, and the administration of marine hospitals;

(*d*) The supervision, as regards the public health of railways, boats, ships and all methods of transportation;

(*e*) The supervision of Federal public buildings and offices with a review to conserving and promoting the health of the Civil Servants and other Government employees therein;

(*f*) The enforcement of any rules or regulations made by the treaty between the United States of America and His Majesty relating to boundary waters and questions arising between the United States of America and Canada, so far as the same relate to public health;

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(*g*) The administration of the statutes mentioned in the Schedule of this Act and of Acts amending the same, and also of all orders and regulations passed or made under any of the said Acts; and all the duties and powers of any Minister of the Crown under either of the said Acts, or any of the said orders or regulations, are hereby transferred to and conferred upon the Minister of Health;

(*h*) Subject to the provision of the Statistics Act, the collection, publication and distribution of information relating to the public health, improved sanitation and the social and industrial conditions affecting the health and lives of the people;

(*i*) Such other matters relating to health as may be referred to the Department by the Governor in Council."

In every country therefore with a constitution based on federal principles, the central government has always assumed some very definite duties in internal public health administration.

Where do we stand in India, and more important still, along what road are we going? These questions are of very great importance. Our contention is that every one concerned, the Government of India, and all local governments, should seriously consider the present position. What has been the effect of the Reforms Act on public health and public health administration and progress? Are they of opinion that more co-ordination would be helpful? Have they any well defined public health policy? What place is public health going to take in the deliberations of 1929; and—most important—how is it to figure in future legislation based on these deliberations?

Of the international health relations of India we need have no concern. External conditions will continue to keep these correct and vital. But with regard to the function of the Government of India in internal health matters of India, with its relations to provincial public health, and of the relationships of inter-provincial public health, we have fears that, as in the past, insufficient consideration will be given in political deliberations because of a lack of appreciation that sanitation and public health are integral parts of politics. In any case no more hasty leaps in the dark should be taken. The subject is of such importance that we consider it necessary that the whole question should be considered before 1929 by a Commission or Committee, and that the information collected by this Commission and their conclusions on the whole subject of the internal public health of India should be available for the Royal Commission which will visit India in 1929.

APPENDIX.

Under the Devolution rules the responsibility for public health and sanitation is divided between the Central and the Provincial Government as follows:—

Central.

1. Pilgrimages beyond India.
2. Port quarantine and marine hospitals.
3. Central agencies and institutions for research.
4. Statistics.

Provincial.

5. Public health and sanitation and vital statistics subject to legislation by the Indian legislature, in respect to infectious and contagious diseases, to such extent as may be declared by any act of the Indian legislature.
6. Pilgrimages within British India.
7. Registration of births and deaths, subject to legislation by the Indian legislature for such classes as the Indian legislature may determine.
8. Industrial matters:—
   Smoke nuisance.
   Health and housing of labour.

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By F. M. POTTINGER, M.D.

(*British Med. Journ.*, 9th July, 1927.)

The subject of tuberculosis is of such paramount importance in India that we offer no apology for quoting largely from a recent article in the *British Medical Journal.*

The fact that tuberculosis heals itself by inflammation occurring as a result of allergic reaction called out by bacilli escaping from foci already existing within the host or from infections coming from without is now universally recognized. In natural infection immunity is built up by repeated reinoculations of bacilli, the source usually being the original focus or some successive focus produced from it. Immunity is built up in experimental animals by repeated inoculations with small numbers of bacilli, always short of the number necessary to cause uncontrollable infections. Each infection that is overcome leaves the host with an increased resistance to future infections. Stimulation of unhealed foci previously existing is a part of the reaction following reinfection. It also follows the injection of bacillary protein. Uhthoff reported ten cases of ocular tuberculosis treated by old tuberculin, when large doses were being used. He started with 0.5 or 1 mg. He produced violent focal and general reactions, and even noted a spread of the disease in three instances, but all ended in healing. Königshofer and Maschke also reported a case of corneal tuberculosis which healed after one violent focal reaction. The same tendency to heal following reactions is seen in foci existing in parts of the same lung distant from the site of a reinfection or in the opposite lung, or in the larynx, glands, testicle, or other organ. While these reactions give the picture of acute inflammation, they are a part of the allergic response. Focal reactions caused by reinfection and the injection of tuberculin seem to be identical.

Caseation and Fibrosis: Acuteness and Chronicity.

Two distinct processes go on side by side in tubercle: caseation in the centre, and fibrosis at the periphery.

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These occur in both primary and secondary tubercle. When fibrosis predominates healing results. Even caseous tubercle often heals by an encapsulating fibrosis encroaching upon the tubercle and penetrating toward the centre of the caseous mass. The allergic reaction, according to its severity, varies between two distinct effects—proliferative and destructive. In most distinguishable reactions evidence of both is present. Slight reactions show a predominance of the proliferative or productive effects, and severe ones of destructive effects. The acuteness or chronicity of the tuberculous process depends on the relative predominance of these phenomena.

The important fact is that chronic tuberculosis, which is accompanied by marked immunity of the host, is characterized by repeated slight reactions due to repeated new infections of small numbers of bacilli, in which production of new tissue predominates; and furthermore, that these same phenomena characterize slight tuberculin reactions. They are usually so slight that they are not even accompanied by elevation of temperature. Acute active tuberculosis, on the other hand, which is characteristic of relatively low immunity, is produced by repeated inoculations of large numbers of bacilli, and is characterized by a markedly exudative process with caseation and necrosis. This same type of severe reaction is found when tuberculin is administered in very large doses. In other words, small doses of bacilli or tuberculin in the tuberculous animal or man stimulate fibrosis and favour chronicity, while large doses of bacilli or large doses of tuberculin, particularly if often repeated, favour caseation, necrosis and acuteness.

Tuberculin possesses Immunizing Properties similar to Bacilli.

Tuberculin, when introduced into the tissues, has at least some of the properties of living and dead bacilli. Both living and dead bacilli will cause histologic tubercle, which is a non-specific tissue response; both will create an immunity response in the host; and both will call forth an allergic reaction favourable to healing in an individual, animal or man, who is already infected. Certain experiments seem to indicate that tuberculin possesses all of these properties, though the first two in very slight degree. It has recently been shown that tuberculin will produce histologic tubercle, although previously this had always been denied. Certain preparations containing the bacillary wax might easily do so. Immunity has also been reported as having been produced by tuberculoprotein in non-tuberculous animals, although it is of slight degree.

Needless to say, the ideal cases of tuberculosis for tuberculin treatment are the same as for any other form of treatment—those with limited areas of involvement in which fibrosis predominates. The exudative type is not so favourable for treatment, but need not be excluded. In many a patient suffering from the exudative type of tuberculosis its character can be changed, so that fibrosis becomes the dominant characteristic; and just as small reinoculations produce this effect in the natural course of the disease, so can small doses of tuberculin aid in establishing the same result if injected at not too short intervals.

It has long been recognized, even by those who are not particularly inclined to use tuberculin, that patients in whom the healing process has come to a standstill are often helped by tuberculin. Many curable cases of tuberculosis can secure sufficient stimulation of their immunizing forces to produce healing without any artificial or therapeutic aid. The reactions produced by their own reinfections are sufficient. But nature sometimes fails, and it is often highly desirable that the allergic reaction should be still further invoked in order to bring about focal response. Stimulation of the allergic reaction can only result regularly from reinoculations of bacilli, or from the administration of dead bacilli or bacillary protein. Therefore in all instances when further allergic reactions are desirable to complete encapsulation of foci, tuberculin may be used advantageously. Those who follow out a satisfactory treatment including tuberculin secure a larger percentage of favourable results with fewer relapses than those who omit tuberculin from their treatment. This fact should be inferred because of the specific power which resides in tuberculin when properly administered to stimulate fibrosis.

In its property of fortifying an already established immunity and utilizing the allergic response in the formation of fibrosis lies the main claim for the therapeutic value of tuberculin. This, however, is not its only property. When employed improperly it has the property of favouring caseation and necrosis in a tissue which is already prone to take on these changes. This is what many clinicians fear, but such fear is displaced by experience. It is now plain that reinfections caused by small numbers of tubercle bacilli, which occur at not too frequent intervals, increase immunity and favour healing by producing an encapsulating fibrosis; and that reinfections caused by large numbers of tubercle bacilli, particularly if repeated at too frequent intervals, depress immunity and favour the spread of the disease by producing necrosis and softening of caseous foci. This is identical with the effects of small and large doses of tuberculin. Small doses of tuberculin may produce no reaction at all in the tuberculous focus; larger ones may cause only a slight hyperæmia about the periphery of the tubercle with the exudation of a few cells and the formation of fibrous tissue. Still larger ones produce more pronounced effects; and very large ones cause marked exudation with softening of the caseating foci.

There is nothing in this to frighten a trained physician. It simply emphasizes the necessity of learning how to use tuberculin so as to obtain the healing effects and avoid the destructive action.

Rarely do we get a temperature reaction of more than 100° during the entire treatment of a patient extending over a period of months; yet we secure the beneficial focal effects necessary to promote healing.

The danger from reactions is very much exaggerated in the minds of many. Only such reactions as greatly depress the patient's immunity are harmful. The patient's reinfections frequently give temperatures up to 100° or 101°, lasting four or five days, with no ill-effect following; and, as Aschoff says, the larger reinfections, if they are overcome by the patient, leave him with his immunity very much increased. Our attitude toward tuberculin reaction should be governed by what we know of the reactions caused by natural reinfection. Since the patient can build up a high state of immunity by repeated reinfections, so small as not to disturb the temperature curve, or cause other constitutional effects, and can also by such slight reactions build up a fibrosis wall sufficiently strong to encapsulate his bacilli, we should emulate this natural method in our administration of tuberculin. This does not mean that we should have fear of an occasional focal reaction accompanied by temperature elevation. On the contrary, healing is often hastened by such an allergic response. We should, however, always endeavour to avoid severe repeated reactions.

Rise of temperature and constitutional symptoms are not necessary to focal reaction. Sometimes general response may be suspected by feelings of increased nervousness following the injection; but this must be definite, for patients are prone to blame the injections for every uncomfortable feeling that comes to them. Increased cough and expectoration is usually present short of temperature elevation, and by this the clinician may know that he is securing desired focal effects. Focal reactions are desirable, but severe focal reactions are unnecessary and usually to be avoided. But tuberculoprotein will call forth the specific allergic reaction in tuberculous individuals, increase the existing immunity, and promote healing in a manner similar to living or dead bacilli. Herein lies its claim as a therapeutic measure.

We cannot separate tubercle from the allergic reaction, because this immunity response begins as soon as infection is well established. Skin sensitiveness, which is an indication of the presence of allergy, beings to show shortly after inoculation, and is well established in from three to five weeks, according to the severity of the infection, being shorter in severe and longer in mild infections. While it is possible for the body to wall off

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and encapsulate particles of inanimate substances and hold them imprisoned indefinitely, it is questionable whether it could encapsulate and retain permanently viable tubercle bacilli without the aid of the specific cellular response. Allergy is established only in response to tubercle bacilli and their products. We accept it as a measure of the patient's resistance, and note that it is increased by repeated infections, provided they are of such size that the host can manage to bring them to a state of quiescence.

If the host is able to overcome a very severe reinfection, his allergy or immunity is correspondingly greatly increased.

It is estimated by Aschoff that about 40 per cent. of primary infections heal completely and protect the individual from further infection. The remaining 60 per cent. have reinfections.

The time to cure tuberculosis is when the lesion is small. The 60 per cent. of tuberculous individuals who show reinfection because their primary focus fails to heal deserve careful attention in the programme for the prevention and cure of tuberculous disease. Every such case must be looked upon as a potentially active clinical tuberculosis. What prevents such an outcome in any of this group is that reinfection in certain instances builds up a protective mechanism to such a degree that exogenous infection is barred. The allergic property of the cells encapsulating existing foci is stimulated, sealing up the patient's own bacilli and preventing them from becoming a further menace. Small doses of bacilli repeated at not too short intervals will do this; but, so far, we can only depend on the accident of natural reinfection, which too often proves unreliable by producing a spreading disease which does not stop until beyond bounds.

Tuberculin has the property of utilizing the allergic reaction in healing. It will stimulate the defensive inflammatory response and aid in walling off infection. It is in these early cases of failure to heal that tuberculin is especially valuable.

[We advise our readers to study this article in conjunction with those of a similar nature (but having reference particularly to Indian conditions) contributed by Dr. C. Frimodt-Möller to the June and July numbers of the *Indian Medical Gazette*.—Ed., *I. M. G.*]

The Physical Effect of Radiation.

(*British Med. Journ.*, 2nd July, 1927, p. 9.)

In the Mackenzie Davidson Lecture, delivered before the Roentgen Society and the Electro-therapeutic Section of the Royal Society of Medicine on June 30th of this year, Sir Humphry Rolleston deals (*inter alia*) with (*a*) the physical effects of radiations on patients, (*b*) the physical effects of long continued work in radiological departments on those thus engaged.

(*a*) The untoward effects of radiations on patients are usually acute and in the form either (1) of burns and epilation as a result of excessive dosage, or possibly in very rare instances from idiosyncrasy, or (2) of acute constitutional symptoms which have become more prominent since the introduction of intensive *x*-ray treatment of deep-seated abdominal malignant disease. The production of burns and dermatitis may entail legal actions for compensation, and a blow to the *x*-ray worker's reputation. Although the untoward effects of irradiation are usually acute, patients frequently exposed to radiations may become gravely anæmic; but in the cases thus treated it is often difficult to decide between the influence of (*a*) radiations on the hæmopoietic tissues, and (*b*) of the involvement of the blood-forming tissues by the disease from which the patients are suffering; thus infiltration of the bone marrow by malignant disease or lymphadenoma, or leukæmic change, may be regarded as responsible; cases of aplastic anæmia after *x*-ray and radium treatment for chronic leukæmia have indeed been reported (Ross, 1925; Whitcher), but are open to alternative explanations.

The acute constitutional symptoms (Roentgen-ray intoxication; radio-toxæmia) are of several degrees. The comparatively mild symptoms of malaise, lassitude, loss of appetite, nausea and occasional vomiting, compared by Béclère (1921) to sea-sickness, have been ascribed to the effect of ozone and noxious nitrous gases in ill ventilated *x*-ray departments; on the other hand, they may be minor results of the process responsible for the graver manifestations. A distinction has been drawn by Mallet and Coliez between (*a*) the immediate and comparative mild effects, which usually pass off in forty-eight hours, and (*b*) the more severe constitutional symptoms with delayed onset, fortunately uncommon, and consisting of uncontrollable vomiting, offensive diarrhœa with the passage of blood, abdominal pain and distension, fever which may reach 104°F., profound prostration, progressive cardiac failure, and sometimes a fatal issue.

(*b*) *The Physical Effects of Long-continued Work in Radiological Departments on those thus engaged.*

Soon after the discovery of *x*-rays the harmful effects on the operators and patients became known; in March 1896, information arrived to the effect that Edison and Dr. W. J. Morton had suffered with conjunctivitis as the result of some hours' exposure (*Nature*, 1896, liii, 421). The skin lesions, *x*-ray or radio-dermatitis, were noticed in the same year, and in 1897 D. Walsh first directed attention to acute constitutional symptoms by describing them in *x*-ray workers, in one of whom the symptoms disappeared when the abdomen was shielded by lead. Since then a very considerable literature has grown up on the subject of the untoward effects of radiations. In 1911 Krause stated that fifty-four fatal cases of cancer had been traced to radiations, and in 1922 Ledoux-Lebard estimated that one hundred radiographers had paid this penalty. In addition, sterility, first noted by Albers-Schönberg, is now fully recognized physiologically and therapeutically; in 1905 Brown and Osgood found unsuspected sterility in eighteen persons employed in manipulating *x*-rays from half an hour to four hours three times a week or from two to six years—a somewhat startling revelation.

The blood changes in *x*-ray and radium workers—namely, anæmia, leucopenia and lymphopenia—are of special importance as they can be detected in an early stage, and so further progress towards grave aplastic anæmia can be prevented by cessation of exposure, this method of early recognition and prevention being analogous to that practised in lead workers. The leucopenia immediately following irradiation is due to destruction of leucocytes in the circulation, as is shown by their remains seen in blood films, whereas the prolonged leucopenia is the result of injury to the hæmopoietic tissues. The two grave blood disorders seen in persons long exposed to radio-active substances are acute aplastic anæmia and leukæmia, of which Jaulin has recently collected nine and eight examples respectively. It is generally believed that the radiations act by producing aplasia of the bone marrow; but from experiments on guinea-pigs Fabricius-Moller believes that a large dose of *x*-rays first produces the leucopenia and then, after a week, thrombopenia with the hæmorrhagic diathesis, and that the anæmia is due to hæmorrhages; Knud Faber, however, contends that if this was the sequence of events the colour index in the experimental animals should be very low, which is not the case, as indeed Fabricius-Moller admits. The occurrence of leukæmia was ascribed by Weil and Lascassagne to a stimulating action of radiations on the bone marrow—an explanation which raises the vexed question of the existence of a stimulating influence of radiations.

Considering the relatively larger number of *x*-ray workers, radium appears to have a rather undue tendency to cause aplastic anæmia. The leukæmia cases appear to be almost confined to *x*-ray workers, for there has been only one exception—the case of myeloid leukæmia reported by Weil and Lacassagne in a thorium worker.

The personal knowledge that peptic ulcer of the stomach and duodenum and malignant disease of the alimentary canal have occurred in radiologists of long experience, coupled with the gastro-intestinal lesions of

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the acute constitutional symptoms occasionally seen after intensive applications of x-rays to the abdomen, naturally arouses the suspicion that there may be more here than mere coincidence. It is true that peptic ulcer is rather frequent in medical men who are not radiologists, and also that radiologists may, like other medical men, suffer as the result of irregular meals and too regular smoking. Experimentally massive x-ray exposures of the abdomen cause acute damage of the intestinal mucosa, and Lazarus-Barlow obtained similar results with the gamma rays of radium; it might therefore be thought that less severe though long-continued exposures might favour chronic inflammation. By the rather extreme procedure of opening the stomach and exposing the mucous surface to x-rays, Wolfer produced a chronic gastric ulcer. Though peptic ulcer cannot be regarded as a radiologist's disease, it may be worth while to bear these possibilities in mind.

Largely as a result of the energy and initiative of Sir Humphry Rolleston himself, a Committee on Protection was set up in London in 1921: this Committee issued its preliminary report in July of that year and a second and revised report in December 1923. A third and expanded report containing a section on ultra-violet therapy is now in the press. The recommendations of the Committee have been largely followed by Great Britain, the U. S. A., and the majority of European countries. It is certainly to be hoped that their adoption will be world-wide in the interests of patients and radiologists alike.

The Important Early symptoms in Diseases of the Breast.

By Sir G. LENTHAL CHEATLE.

(*British Med. Journ.*, 9th July, 1927.)

In an exceedingly interesting and instructive address on "The Important Early Symptoms in Diseases of the Breast," Sir Lenthal Cheatle touches first of all on certain elementary anatomical points.

Each gland possesses from fifteen to twenty ducts, which have innumerable branches ending in acini. The ducts and acini are lined from within outwards by (1) epithelium, (2) a single layer of unstriated muscle fibres, (3) a delicate fibrillous tissue containing scattered cells of myxomatous appearance, (4) the elastica which surrounds the ducts and not as a rule the acini, (5) the pericanalicular and periacinous connective tissue. These tissues compose the breast structure, and are embedded in supporting connective tissue. Any of these five tissues may, either singly or in combination, undergo diffuse or local hyperplasia quite apart from any similar change that may occur in the supporting connective tissue.

If the breast be thin and the affected ducts and acini superficial any hyperplasia in these structures would give rise to true nodularity of the breast. If this nodularity be true we are dealing with a problem of "hyperplasia," and must not use the meaningless misleading term (for only a term it is) "chronic mastitis." This term conveys no meaning, because true nodularity of the breast is caused by many diverse forms of hyperplasia. Nodularity may be due to an epithelial hyperplasia in its earliest stage of carcinoma, and all chance of saving life may be lost by simply regarding it as a "chronic mastitis." All forms of true nodularity of the breast, must be looked on from the point of view of hyperplasia.

Following a survey on the relationship of stimuli to hyperplasia, he passes on to describe symptoms that render it essential for a correct diagnosis to be made at once. He purposely excludes those cases in which there is a tumour in the breast substance associated with enlarged glands in the axilla—the clinical diagnosis of carcinoma can be made almost with certainty upon these signs. It is much more important to concentrate on the signs and symptoms of *early* disease of the breast of which the following are the most important.

1. (*a*) Nodularity localized to one part of a breast, or one part of a breast where nodularity is more marked than at any other part; (*b*) a lump in the breast, and when neither (*a*) nor (*b*) exhibits adherence to skin nor enlarged lymphatic glands in the axilla.

2. It is difficult for women, who are so accustomed to pain, to associate it with pathological lesions in their breasts. They do not regard pain in their breasts as being so important as when it occurs elsewhere. At puberty they experience mammary pain, which is repeated throughout the term of their menstrual periods. Any irregularity of the pelvic visceral organs induces pain in the breast. Various emotions may give rise to it. Thus throughout life a certain amount of pain in the breasts is so common that many women regard it as a normal experience. The fact makes difficult an attempt to elicit pain as part of the history of a pathological lesion.

But if a history be carefuly taken and a special point be made of asking the patient to try and remember when she noticed a pain in the breast to which she was not accustomed, she will often say, "Oh, well, I did notice a little stabbing pain, but I did not take any notice of it."

Pain of this lancinating, stabbing character is often the earliest symptom of carcinoma of the breast, and the want of knowledge and appreciation of its importance on the part of the patient allows this important sign to be lost.

3. A spontaneous intermittent discharge of blood from a nipple. A spontaneous discharge of blood from a nipple may be due to duct carcinoma, to carcinoma arising deep in the breasts in terminal ducts and acini, but also to papillomata, and very frequently the discharge occurs (from these causes) when neither lump nor nodularity can be felt. Occasionally a papilloma in one ampulla may be the only tumour in the breast. On the other hand, a duct may contain hundreds of them situated throughout the whole of its course. Again, two or more papillomata may exist not in an ampulla at all, but in deeper parts of the breast. There is no clinical information to guide us as to whether there is only one papilloma in an ampulla, or whether there are multiple papillomata in the breast. Papillomata in a duct are as dangerous as in the large intestine; they are often associated with carcinoma.

4. Spontaneous discharge of serum from the nipple may be caused by the same diseases that induce hæmorrhage from the nipple, and should be regarded with the same degree of seriousness.

5. A gradually retracting nipple.

When any one of these signs exists it should be taken as a signal of danger. A lump or nodularity should be widely excised and microscopically examined. The same treatment should be applied to a part in which there is a local focus of pain. The whole breast shoud be excised as for carcinoma when there is spontaneous discharge of blood or serum from the nipple. Lives are being lost by disregarding the importance of these early signs.

All those surgeons who think they are giving important educational information to the public have made a great point of advising women to consult their doctors directly they notice a lump in their breast. Let us consider what are the implications of that advice so sincerely given. It implies that the patient is securing treatment early in the disease, whereas really when a lump appears in carcinoma the disease is well advanced, and is already threatening the patient's life, possibly beyond all hope of a cure. A woman with that advice in her mind may feel a pain, see a discharge of blood or serum from her nipple, think that these are unimportant because she can feel no lump, and that therefore it is unnecessary to consult a doctor. The attempt to educate the public to become acute clinical observers is very praiseworthy, and if one were deeply impressed with its advisability one would make a great point of telling women that it is more essential that we should see their breasts before any lump has appeared. We want to see their breasts if they have either local nodularity or lancinating pain in one spot, or a discharge of blood, or a discharge of serum from the nipples. In any event we have no chance of obtaining better results after the operation for carcinoma of the breast unless we are able to attack the disease in an earlier state than we do at present.

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Acute Cardiac Dilatation in Intravenous Therapy.

By J. H. CLARK.

(*Journ. Amer. Med. Assoc.*, July, 1927, p. 21.)

CLARK sounds a note of warning on the possible dangers of intravenous therapy in certain cases. The cases to which he particularly refers are those in which relatively large volumes of physiological saline with or without dextrose are introduced into the circulation with the object of restoring the balance of fluids in the tissues. He records three cases from his own experience and a fourth in the practice of a colleague, in which fatal results followed the intravenous injection of large volumes of physiological solutions: the cause of death in these cases was considered to be acute cardiac dilatation. When such procedures are called for it is essential that the injections be given slowly and that careful watch be kept on the pulse and cardiac conditions during the injection.

Note.—(We would recommend our readers to assimilate these remarks in conjunction with the résumé on intravenous therapy published in the September number.—EDITOR, *Indian Medical Gazette.*)

Barraquer's Operation.

AN interesting article on the subject of Barraquer's operation of phacœrisis, from the pen of Dr. J. Russell Smith, son of Lieutenant-Colonel Smith of Jullunder, appeared in the April number of the *British Journal of Ophthalmology.*

In this he describes in detail the working of the pump of Barraquer's apparatus, and points out how the intermittant vacuum impulse is produced at the cup of the pneumatic forceps, and how the period and degree of this 'vibratory vacuum' can be varied, and is supposed to effect, through the lens, the rupture of the zonular fibres: though as regards this point he is very sceptical. He also describes a series of experiments he did on pigs' eyes which suggest that the best, and indeed the only really practical way, of rupturing the zonule and causing tumbling of the lens is by pressing the lens slightly back into the vitreous, before starting the version of the lens with the pneumatic forceps, and he is convinced that this must be the method by which Barraquer obtains his brilliant results.

Certain other points are touched upon, such as the relative strength of the capsule and zonular fibres at varying ages and in differing types of cataract, and also the necessity for a really large incision. He discusses the relative advantages of Barraquer's and Cruickshank's types of pumps.

The article is one well worth reading in the original by anyone interested in the intracapsular extraction of cataract.

A Simple Staining Rack.

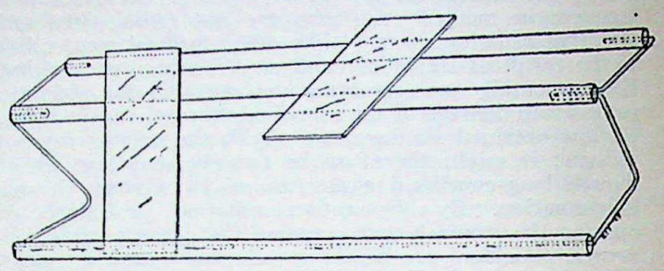
By ROY F. FEEMSTER, M.D., D.P.H.

(*Journ. of Amer. Med. Assoc.*, 25th June, 1927.)

THE following simple piece of apparatus may prove useful to workers in *mofussil* districts: it is described and figured by Dr. Roy F. Feemster of Louisville, Ky., in the *Journ. Amer. Med. Assoc.*, 25th June, 1927.

"It is often a problem to find a place to lay a slide when staining or drying it in a laboratory which is not provided with special staining vessels with slide rests or holders. Becoming tired of having my slides fall from improvised rests while staining them, or having to stand them against reagent bottles to dry, I was finally reduced to constructing a staining rack for my own use. It has proved so satisfactory that I deem the idea worth sharing with others.

All the materials necessary are three pieces of glass tubing of the same length, and a piece of fairly stiff wire. The wire is run through the front lower piece of tubing, as shown in the accompanying illustration, and about 8 or 9 inches is allowed to project out at each



end. These ends are bent at right angles to the tubing in the same direction. About 2¼ inches back each wire is bent up and forward at an angle of about 45 degrees. A double bend inward is now placed in the portions projecting upward, so that the second tube may be held in place. A perpendicular line dropped from the second tube should strike the table about a half inch back of the lower tube. The remaining part of the wire is bent back parallel with the table and the ends turned inward, about 1½ inch behind the second piece of tubing, to hold the third piece of tubing.

The two upper glass tubes now act as a support for slides in a horizontal position during staining, and the two front ones allow the slides to be placed on end for draining and drying.

The rack may be made of any length, depending on the length of the tubes used. One about 12 inches long will accommodate eight or ten slides at a time and will be long enough for most laboratories. A piece of blotting paper placed under the rack will protect the table and at the same time hasten the draining of the water from the slides."

Death from Quinine Poisoning.

By H. M. RAVEN, M.R.C.S., L.R.C.P.

(*British Med. Journ.*, 9th July, 1927.)

RAVEN reports a case of death from quinine poisoning in England. The case was that of a female patient who took about forty-eight 5 grain tablets of quinine bisulphate 'in order to ensure sleep.' The post-mortem examination revealed no signs of organic disease, and a verdict of 'death due to heart failure the result of taking a large quantity of quinine' was returned.

Stovarsol in Malaria.

F. GUERIN, E. Borel and M. Advier (*Bull. Soc. Path. Exot.*, April 1927, p. 331) have attempted to estimate the value of stovarsol in the treatment of the various types of malaria. They tried to give effect to Sinton's rules for testing the efficacy of any treatment, but found that some of these could not be complied with in the conditions under which they worked. Sodium stovarsol was used, 1 gram being given intravenously in 8 c.cm. of the vehicle. Temperature and blood observations were made during the following three days. The authors conclude that stovarsol has no direct action in malaria, except in infections with *Plasmodium vivax;* that even in such cases, although all parasites may disappear temporarily from the blood, relapse within two months is the rule, and that in benign tertian cases stovarsol causes a febrile reaction not produced in the other infections. They agree, however, that stovarsol is a valuable adjunct to quinine in quartan and subtertian cases, and consider it a very effective remedy in benign malaria, although not a definitely curative drug.—*Brit. Med. Journ.*, 9th July, 1927.

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London School of Hygiene and Tropical Medicine.

(Division of Tropical Medicine and Hygiene.)

EXAMINATION RESULT. 82ND SESSION. MARCH—JULY, 1927.

Passed with Distinction.

Aird, R. Winner of "Duncan" Medal.
Smith, E. C.
Yeo, K. C.
Greer, W. N.
Moore, W. B. A.
Landau, J. V.
Oonvala, J. H.
Lindberg, K.
Rice, E. M.
Tung, E. Ho.
Alexander, G. L.
Bacon, C.
James, C. S.
Mahajan, R. C.
Ramsay, G. W. St. C.
Selby, F. L. G.
Whitbourne, D.
Bird, E. M.
Elmes, B. G. T.
Sharp, C. E.
Steel, C. R.
Winchester, J. W.
Williamson, J.
Dixey, M. B. D.
Kolapore, F. J.

Passed.

Boyce, G. T. G.
Iago-Jones, D. E.
Pallister, R. A.
Chantler, H. C. E.
Dunlop, I. M.
Le Clezio, R.
Sanders, L.
Madwar, S.
Crawford, R. P.
Forbes, A. L.
Jobson, E.
Purcell, F. M.
Ramsay, I. D.
Small, F. V.
Brown, D. M.
Thomas, L. H.
Hopkins, H. O.
Hammacher, J. F. M.
Rapen, S. J.
Latham, D. V.
Salem, H. H.
Hall, R. N.
Phillips, R. K.
Smith, W. C.
Ware, T. W.
Napier, G.
Manson, J. K.
Knobel, W. F.
Taylor, G.
Razzak, A. A.
Poh, L. H.

Reviews.

TROPICAL SURGERY AND SURGICAL PATHOLOGY.—By K. K. Chatterji, F.R.C.S.I. London: John Bale, Sons and Danielsson, Ltd., 1927. Pp. xxx plus 244, with 91 plates, 20 in colour, and 5 charts. Price, 16s. net.

There has undoubtedly been a long-felt demand for a book on tropical surgery and Major K. K. Chatterji is to be congratulated on his effort to fill this gap in surgical literature. To write any textbook in a foreign language is no small achievement; to write an entirely original work, such as this, is a gigantic one.

The book opens with a somewhat lengthy introduction, much of which might have been dealt with and expanded in separate chapters. For example, hospital construction and the effects of climate are both worthy of a chapter to themselves, while the same can be said of anæsthesia and surgical technique.

We regret to note that the author regards chloroform as the standard anæsthetic. Owing to the high temperature and bright sunlight we are convinced that it is more dangerous than in temperate climates, and it is only the fact that deaths due to or occurring under anæsthetics are not the subject of a coroner's enquiry in India that causes the present views on the safety of chloroform to prevail. The statement that ether anæsthesia is not practised is incorrect. It is the common anæsthetic in one of the larger Calcutta hospitals. Furthermore, within the last month an official circular from the Government of India has been circulated advocating the more general use of ether on account of its greater safety.

We agree that preparation of the skin is an important item, and for that very reason wish the author had been a little more explicit in his advice. We are quite sure his routine is not "razor, soap, turpentine, biniodide spirit lotion (1 in 500), ether, acetone, alcohol, iodine, alcoholic solution of picric acid, etc., freely used."

The author is satisfied that there is more risk of sepsis in the hot weather and quotes observations supporting this. He advises postponing non-emergent operations to the cold weather. We doubt very much if there is sufficient difference to justify this, and in hospital practice it is impossible. We are more inclined to agree with the writer in Keen's *Surgery*, when he says that equally good results are obtainable in the tropics as in more temperate zones.

The first section deals with amœbiasis, and forms a very complete account of the lesions due to the *Entamœba histolytica*, both medical and surgical. Attention is drawn to the combination of syphilitic and amœbic infection being an unhappy one, and the author is inclined to attribute the benefit often recorded from arsenical preparations to the effect on latent syphilis.

He also draws attention to the pericolitis and peritonitis accompanying severe amœbic infections of the bowel, a condition that has been generally overlooked. We are afraid we cannot endorse the author's recommendations on amœbic appendicitis. Appendicitis due to any cause, once diagnosed as such, should be operated on and no time wasted on a full course of injections, irrigation, etc. There should be no waiting for signs indicating suppuration and an abscess. The differential diagnosis between appendicitis and dysentery might have been extended with advantage. The chapters on hepatic amœbiasis are excellent, and every surgeon will read them with pleasure and profit. The author makes out an excellent case for his preference for his own method of dealing with liver abscess by drainage, suction and irrigation.

The remaining chapters on amœbiasis deal with the rarer sites of amœbic infections, including the spleen, lungs, brain and genito-urinary system. In view of the fact that amœbic abscess of the brain proves that hæmatogenous infection of distant organs can take place, infection of the genito-urinary is, we admit, quite possible, but as we know of no recorded case it must be extremely rare. We do not consider the fact that cases of cystitis, etc., have cleared up under emetine plus symptomatic treatment is sufficient evidence of amœbic infection.

This section on the surgical aspects of amœbiasis is without doubt the most complete presentation of the subject in any textbook, and should be read by all practitioners in the tropics. The next large section deals with filariasis and rivals in its completeness the section on amœbiasis. There are included in it full descriptions of many conditions, not necessarily rare, but certainly not described in any textbook. We are indeed struck by the number and variety of lesions of the genital organs attributed to filariasis. We certainly consider Major K. K. Chatterji is to be congratulated on this feature, which well repays reading even by the experienced surgeon in the tropics.

Turning to questions of detail, as this book is written primarily at the request of students, it would have been better to describe the standard operations for hydrocele, and add the author's modifications and special operations as alternative procedures. Of lymphangioplasty with silk threads we do not anticipate we shall have much experience, though we do not doubt that eventually adhesions form between the parietal and visceral layers of the tunica vaginalis. Conditions due to filarial lymphangiectases are frequently puzzling to the young surgeon in the tropics. These are fully described by the author, their differential diagnosis dealt with, and treatment sufficiently outlined.

Elephantiasis is fully described, and the numerous surgical measures that have been tried re-outlined so that the novice may if so inclined buy his own experience. We think that the author might have indicated more clearly that most of these measures are now of purely historical interest, and it is scarcely necessary to redescribe on page 110 an operation already described on page 90—91. Dealing with elephantiasis of the limbs, the author states

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that he has had good results by excising the elephantoid mass down to the fascia and then grafting either with autogenous Thiersch grafts or even by Wolfe grafts from animals, and in some cases ovo-membrane. He does not state the subsequent history of these cases, but general experience is that animal grafts, even if they do well for a time, melt away. Elephantiasis of the scrotum, as being most amenable to surgical treatment, naturally is very fully dealt with, and the operation of Sir Havelock Charles described. The author sees no advantage in using a Clover's crutch and thinks it does not facilitate the operation. This is easily understood when we find he requires three nurses and five assistants to perform the operation. Very few of us can command this plethora of assistants and have to fall back on Clover's or other mechanical assistance. The various flap methods are referred to and references given in the bibliography, but the author pins his faith to the old operation.

In a new edition he would be well advised to give a description of the newer operations, as in our experience the end results of the old method frequently leave much to be desired.

Filaria loa and *F. medinensis* are briefly dealt with. The tropical granulomata are described in detail, the only noteworthy omission being that due to *Rhinosporidium seeteri;* while actinomycosis is included, though the disease is practically restricted to temperate climates. Madura foot is somewhat scantily dealt with, any reference to the pathology being omitted. There are some seven different parasites associated with this disease, of which three are common in India, and it certainly would not have been out of place to mention them. Contrary to the author's experience, we have never seen any benefit from preparations of iodine. Short chapters follow on schistosomiasis, ascariasis, and those curiosities of tropical medicine, goundu, pes gigas, big heel, ainhum; but as these are not common in India, the space devoted to them is quite properly limited.

The last part of the volume includes chapters on abdominal surgery in the tropics, and on neoplasms in the tropics. These are more in the nature of an enumeration of the author's interesting cases than a serious account of features peculiar to the tropics. We cannot endorse the author's recommendation to try expectant treatment in suspected rupture of the spleen, and consider it a dangerous recommendation for young surgeons faced with the responsibility of deciding on an operation having a high mortality rate. The author's warning against attempting a subcapsular splenectomy is surely unnecessary. We cannot imagine any one who has seen a spleen ever attempting it. The final chapters on snake bite and saline injections for cholera are useful and are quite properly included in a volume of this description.

The bibliography at the end of the volume is, we consider, open to criticism. Thus in the text Armitage is stated to give statistics of forty-eight cases of amœbic cerebral abscess. We could not find any reference to this important paper in the bibliography. Similarly, while there are numerous references to German, Italian, Portugese and other foreign journals which are not accessible to readers in the tropics, there are quite noteworthy omissions to recent papers in the *Indian Medical Gazette, Lancet,* and *British Medical Journal.* On the first page of the bibliography out of 26 references 17 are to foreign journals, 2 to textbooks and 7 to British journals.

A bibliography to be useful must either be complete, or if incomplete give preference to papers referred to in the text, papers easily accessible to the reader and to the very limited number of papers regarded as classics on the subject. Noteworthy omissions are any references to the surgery of leprosy, hydatid disease and cholera, with the exception of saline injections. In view of the frequency with which the defects arising from cancrum oris have to be corrected, and in view of the fact that rhinoplasty is an operation especially associated with India, the chapter on deformities due to burns might have been expanded into a complete section on plastic surgery. This is admittedly a matter of opinion and of space; it seems to us that from the point of view of the student for whom the book is written space might have been found by reducing the section on neoplasms to the single chapter on the incidence of these in the tropics.

There can be no question that the author has made a noteworthy addition to the literature of tropical surgery, and that future editions will be called for.

A. H. P.

A SHORTER SURGERY: A PRACTICAL MANUAL FOR SENIOR STUDENTS.—By R. J. MacNeil Love, M.B., B.S. (Lond.), F.R.C.S. (Eng.). London: H. K. Lewis and Co., Ltd., 1926. Pp. viii plus 298, with 43 illustrations including 13 plates. Price, 12s. 6d. net.

This is an admirable little book consisting of just under 300 pages, with 43 illustrations, which has been written, according to the author's preface, at the request of many friends, and is an attempt to condense the more important principles of surgery for the benefit chiefly of the student.

A book of this size cannot possibly take in the whole of surgery, but the author has covered a great deal of surgical ground in clear, easily understandable phraseology.

No attempt has been made to describe pathological processes such as the pathology of osteomyelitis, with its formation of sequestra, etc., but the causation, symptoms and treatment of the condition are all gone into shortly, but concisely. All the commoner major operations are also described.

There is a list of errata and corrections at the commencement of the book, but there is one important printer's error which has been overlooked, namely the word "junction" in line 31 on page 240. It should read "function." On the whole Love's little book is a very useful contribution to the literature and we consider that all medical students would do well to add it to their surgical libraries.

MINOR SURGERY AND BANDAGING.—By G. Williams, M.S., F.R.C.S. London: J. and A. Churchill, 1927. Pp. viii plus 439, with 247 illustrations. Price, 10s. 6d. net.

This, the nineteenth edition of Christopher Heath's well-known book, has been largely revised and brought thoroughly up to date. We have no hesitation in recommending it to house surgeons and dressers, as the best textbook on the subject. It is a book with a well established reputation, covering the subject concisely, and yet adequately, and has been an invaluable *vade mecum* to generations of medical students and practitioners.

INFECTIONS OF THE HAND.—By Lionel R. Fifield, F.R.C.S. (Eng.). London: H. K. Lewis and Co., 1926. Pp. viii plus 192, with 67 illustrations, including 2 coloured plates. Price, 9s. net.

This is a most excellent monograph and should be read by all those who practise minor surgery.

The chapter on anatomy is admirably illustrated and draws attention in very clear language to tissue spaces whose existence is unknown to the ordinary student of anatomy. The methods of spread of infection throughout the tissues and bursal spaces of the hand, together with the appropriate incisions are clearly indicated in subsequent chapters.

The types and illustrations are good.

THE SPECIALITIES IN GENERAL PRACTICE.—Compiled by F. W. Palfrey, M.D. London and Philadelphia: W. B. Saunders and Co., Ltd., 1927. Pp. 748. Price, Cloth, 30s. net.

This book of 748 pages has been compiled by Dr. F. W. Palfrey, Professor of Medicine at Harvard University, and consists of 11 sections, namely, dermatology, genito-urinary surgery, gynæcology, rhinology and

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laryngology, obstetrics, ophthalmology, orthopædic surgery, otology, pediatrics, psychiatry, and surgery.

Each section has been written by the Professor at Harvard University of the subject with which the section deals, and the object of the whole book is to assist the general practitioner to unravel "knotty points" without having to refer to exhaustive textbooks on whatever subject he seeks advice; also to obviate the necessity of his having to buy textbooks on every speciality for reference.

To any man who is a specialist it is a matter of extreme difficulty to compress his knowledge of his subject into 50 or 60 pages, and not leave out a great deal of what might be considered essential.

Yet that is what the authors of this book have set out to do, and on the whole have succeeded well, especially those who are responsible for the sections on dermatology and pediatrics, which are the two best sections in the book. We are surprised that no mention is made of the use of diathermy in the treatment of epididymitis and prostatitis in the section on genito-urinary surgery. Again in the section on obstetrics, hyperemesis gravidarum is dismissed in half a page, and in the ophthalmological section conditions such as conjunctivitis, ectropion, etc., have been given only half a dozen lines.

The book as far as it goes is good, and all it contains is in accordance with the latest teaching, and the whole idea of its compilation is excellent. But we are of opinion that it is too small really to serve its purpose in that the general practitioner who buys this book and hopes to find in it a reference for all his difficulties may be disappointed and will in the end have to turn to the larger works for his information.

We would like to suggest that in future editions the compiler should elaborate his excellent scheme and give his authors more scope and make the book at least twice as big.

A TREATISE OF HYGIENE AND PUBLIC HEALTH, WITH SPECIAL REFERENCE TO THE TROPICS.—By Birendra Nath Ghosh, F.R.F.P. & S. (Glasgow). Revised and largely rewritten with the advice and assistance of Colonel A. B. Fry, C.I.E., D.S.O., I.M.S., M.D., D.P.H., D.T.M., & H. Sixth Edition. Calcutta Scientific Publishing Co., 1927. Pp. xvi plus 667, with 122 illustrations. Price, Rs. 6 or 10s. net.

This well-known manual has now reached its sixth edition, a sure sign of its continued popularity and usefulness. The ideal book on hygiene would be a very difficult one to write. For the undergraduate it should present the elements of the subject clearly and simply, and the information given should be as far as possible unequivocal and correct. At the same time it should point out that the subject is much more than merely one in which the student has to receive a short course of instruction and pass an examination. For the specialist it would deal with the multifarious environmental, individual, communal, national and international aspects that now comprise preventive and State medicine in the widest sense.

Dr. Ghosh has succeeded in giving an admirable presentation of the principles and practice of general and tropical hygiene which the student in preparation for his career as a general practitioner should know, while his interest in the epidemiological and legal aspects is stimulated by short interesting epidemiological notes on the tropical diseases of India, and by relevant excerpts of the present laws referring to sanitary matters in Calcutta and the Bengal *mofussil*, placed appropriately at the end of each chapter. Colonel Fry's assistance is evident in the excellent concise account of the epidemiology of Indian malaria, in the sections on anthrax, water and air and ventilation.

In the latter a little more detail might have been given of the kata thermometer, and the "kata reading" is not clearly explained. The new work on vitamin D and sunlight has been noticed, but the importance of vitamin A as a growth factor is perhaps not stated quite definitely enough for the student. The chapter on insects is excellent and the questionable statements noted in the review of the last edition have been mostly removed. The following sentences are, however, of doubtful utility to the eager student, "It has been recently shown (Calcutta School of Tropical Medicine) that *Phlebotomus argentipes* is the vector of kala-azar in Bengal. It also causes dengue." The table of the malaria-carrying mosquitoes of India in the next edition might be usefully revised in the light of more recent knowledge.

The chapter on diet in India is an adequate discussion of dietary in tropical countries, though the jail diet on page 175 has, we believe, been somewhat modified recently from that given.

The chapters on disinfection and restraint of infection have been thoroughly revised and the matter is clearly and well expressed.

The illustrations are numerous, useful, and extremely well reproduced; and the new ones added, such as bathing festivals and Bengal villages, disinfectors (high pressure and sack), various insects, etc., are really illustrative.

The printing, binding and general get up are excellent and the volume convenient and handy to handle.

There are some misprints which should be corrected in the next edition. This manual is the best of its kind that we know, and the author evidently spares no trouble in endeavouring to keep it up to date and reliable.

A. D. S.

NERVOUS AND MENTAL DISORDERS FROM BIRTH THROUGH ADOLESCENCE.—By B. Sachs, M.D. and Louis Hausman, M.D. New York: Paul B. Hœber, Inc., 1926. Pp. 850 with 108 illustrations, including 2 full-page plates. Price, $10.00 net.

This is an entirely new work on the nervous diseases of children, running to almost 900 pages, and indicates the steady progress that is being made in the study of children's diseases and in nervous affections generally. It opens with a concise description of the anatomy of the nervous system in relation to function. For those who wish to go into further detail a bibliography is added at the end of the chapter. The second chapter deals exhaustively with methods of examination. A very complete scheme is outlined and then taken up in detail.

The paragraphs on mental status include a table as a guide to what may be expected from a normal child from the first to the twenty-fourth month. Every practitioner knows the difficulty and responsibility of trying to estimate a baby's mental development, and this table should prove most useful.

This section also includes a series of tables showing the normal function of each muscle, the symptoms of deficient action, the nerve by which it is innervated and the segment it is associated with, while in the last column are given the diseases in which the muscle is commonly involved.

These two sections comprise Part I of the volume, and we have not come across a more complete and at the same time concise account of the examination of a case of nervous disease. Part II deals systematically with the organic diseases of the nervous system. These are dealt with in full detail, and a considerable amount of space is devoted to pathology. By the use of small type the author introduces a great deal of information on the history of each disease, the various views held with regard to its pathology, and new methods of treatment not yet generally accepted. This adds immensely to the value and interest of the articles, without leaving the reader uncertain as to which facts or theories are generally accepted.

In general it may be stated that each chapter is a very complete monograph on the subject with which it deals.

Part III deals with functional and toxic diseases, and includes convulsions, epilepsy, speech disorders, headaches, and disorders of sleep.

Part IV is devoted to endocrine disorders, vasomotor and trophoneuroses. Only 25 pages are given up

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to endocrine disorders and 20 of these are devoted to the thyroid and parathyroid glands. On the plea that a discussion of the other glands would carry one too far afield, the authors fall back on small print and an enumeration of conditions which have been attributed to defective function.

Part V deals with mental conditions and opens with a valuable chapter on the normal child, full of sound advice alike for doctor, parents and teachers.

The authors strongly criticise the Freudian teaching and theory, and indeed obviously find it difficult to restrain their language in referring to it. At any rate after reading this chapter everyone will agree that Freud and psycho-analysis are best left out of the mental hygiene of childhood.

The remaining chapters are concerned with abnormal mental conditions, so that this book covers the whole range of nervous affections.

As a work of reference for the ordinary practitioner, it is the best that we know, and for the consultant either in pediatrics or nervous diseases it should prove invaluable. All through the articles have the hall-mark of personal experience which makes them eminently readable and descriptive. The binding, printing and general get up is of the high standard which we have learnt to associate with the best American publishers.

A. H. P.

MEDICAL INSURANCE EXAMINATION. MODERN METHODS AND RATING OF LIVES.—By J. Paterson MacLaren, M.A., B.Sc., M.B., C.M. London: Baillière, Tindall and Cox, 1927. Pp. xii plus 308. Price, 16s. net.

The author of this volume has had a large experience, both as a medical examiner of lives proposed for insurance and as chief medical officer of a company, in which positions there were presented for his opinion reports on a large number of cases seen by the examining physicians. The author realised very early that there was no book which could give him information which he often desired in reporting on the different types of cases he met with in his practice, and therefore he kept careful notes from the beginning. This book is the outcome of these recorded observations. The volume is divided into three parts. Part I deals with general considerations regarding the examination of lives and with confidential reports of them. In Part II, the author deals with the physical examination of candidates and goes into details of the examination of the lungs, heart, pulse, blood pressure, abdominal and pelvic organs, and of the kidneys and urine. The significance of such conditions as functional albuminuria, renal diabetes, high and low blood pressure, etc., which are often sources of worry to the medical examiner are fully discussed. In Part III, the author deals in detail with the pathological conditions which are insurance impairments, and includes the occupational and environmental diseases. A chapter in this section is devoted to useful hints regarding the rating of lives. The book is full of practical hints of great value in medical insurance examination and is well worth the perusal of medical men who are examining candidates for insurance, as well as of the chief medical officers of insurance companies with whom the final decision rests.

R. N. C.

ACTIONS AND USES OF THE SALICYLATES AND CINCHOPHEN IN MEDICINE.—By P. J. Hanzlik, M.D. London: Baillière, Tindall and Cox, 1927. Pp. xiii plus 200, with 12 figures in the text. Price, 16s. net.

The 'Medicine Monograph Series' is now well known for its very comprehensive review of the literature on important subjects selected by the editors, also for the thoroughness with which various aspects of these subjects are dealt with. The volume under review is one of this series and is no exception to the rule. Part I deals with the chemical and physical nature of the salicylates and cinchophen. Part II deals with their pharmacological actions and discusses their antiseptic properties, local effects, absorption, distribution in the body, action on the gastro-intestinal tract, blood, kidneys, and thermogenetic centres. In Part III various clinical aspects of the uses of these drugs are described. Parts IV and V deal with the toxicology of these compounds and their modes of administration respectively.

The book covers all the available literature since the introduction of these drugs, and the author has taken great pains to sift the evidence collected to enable the reader to form his judgment or opinion, without having to go into meticulous details. The book contains a bibliography of 658 references from the literature and we congratulate the author on putting the subject so concisely and lucidly before his readers.

R. N. C.

WHY TUBERCULOSIS EXISTS—HOW IT MAY BE AND HAS BEEN CURED AND PREVENTED.—By R. Goulburn Lovell. London: John Bale, Sons and Danielsson, Ltd., 1926. Pp. x plus 211, with 20 illustrations. Price, 6s. net.

This book is written by a layman with the object of putting before the public the value of the well-known "Spahlinger treatment" for tuberculosis. It is claimed that curative results far superior to those resulting from any other existing treatment for tuberculosis have been obtained with this treatment. Although patients were discharged from treatment as cured in 1913-1914, the formulæ of the sera and vaccines are still kept secret. The reasons given for this are as follows:—

"(*a*) The production of these remedies, extending over four years, requires prolonged and precise manipulation in order to maintain an exact specificity and sterility. If the technical details were published prematurely, the serum and antigens would be prepared too hurriedly and therefore be ineffective. Discredit could easily be brought upon the treatment and humanity would suffer.

"(*b*) The Ministry of Health, and all other earnest investigators at the laboratories, have made it clear that they do not require the technique to be divulged by which the remedies are prepared.

"(*c*) Upon the highest medical advice, Mr. Spahlinger has wisely followed the example of Professor Ehrlich in respect to his great discovery of salvarsan. Both Ehrlich and Spahlinger have published their methods and principles, but for a period they withheld the formulæ. To judge and apply a remedy on theory alone has meant and will mean sad disasters. Only the test of time can determine the value of a remedy. Fourteen years is the extent of Spahlinger's permanent recoveries of advanced and hopeless cases."

This last argument seems rather weak, as salvarsan was available for use all over the world from the time when it was first heard of, whereas the Spahlinger treatment is not yet thus available even after 14 years. Surely it is a strange slander on scientists in general that "the serum and antigens would be prepared too hurriedly and therefore be ineffective." If the danger of divulging the secret were that patients might be *harmed*, that might be a different matter, but no such danger is mentioned.

While the cases reported in the book are certainly remarkable, the medical profession will have to reserve its final judgment on this remedy till it is possible for the details of the treatment to be made general and its merits tested in the hands of others than its originators.

E. M.

THE SURGERY OF GASTRO-DUODENAL ULCERATION.—By Charles A. Parnett, B.Sc., M.D. (Lond.), F.R.C.S. (Eng.). Bombay: The Oxford University Press and Constable and Co., 1926. Pp. x plus 154. Price, 10s. 6d. net.

This little book is one of the excellent Oxford Medical Publications, each of which deals with a special subject and is written by an authority on that particular branch. The present work deals exclusively with the surgical aspect of gastric and duodenal ulcer, in which as the author says, finality has not yet been reached.

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The account of the pathology and ætiology of the condition is brief but accurate, and in the chapter on symptomatology there are some useful outline diagrams of *x*-ray photographs alongside the reproductions of the radiograms, which should be useful to those unused to reading plates. Two-thirds of the book deals with surgical treatment and here we find that the author belongs to the extreme school. For a number of years it has been recognised that gastro-jejunostomy is not the best operation for ulcers situated on the lesser curve or in the body of the stomach, and that some form of resection operation gave far better results. The majority of surgeons however still consider that gastro-enterostomy is the best operation for duodenal pyloric ulcers. Even in these cases there is a percentage of failures, varying from 5 per cent. to 20 per cent. in the hands of different operators, and of late there has been a trend of opinion in favour of resection in *all* cases of active ulceration whether gastric or duodenal. This is the author's thesis which he argues very ably. The descriptions of technique are clear and well illustrated and we consider that the book should be of value to surgeons.

W. L. H.

PRACTICAL TROPICAL SANITATION.—By E. P. Minett, M.D., D.P.H., D.T.M. & H. and A. G. M. Severn, M.A., M.D., D.P.H. Second Edition. London: Baillière, Tindall and Cox, 1927. Pp. 180.

This is a small manual intended for the use of sanitary inspectors in the tropics. It gives hints on personal hygiene, water supplies, sewage and refuse disposal, foods, markets and slaughter houses. It also gives summaries of the main tropical diseases, a description of simple building construction and cowsheds, a discussion on disinfection, and suggestions for the sanitary control of elementary schools in tropical countries.

On the whole the book should prove useful to those for whom it is intended. It is difficult to decide how much information about tropical diseases should be given to sanitary inspectors. The chapter on tropical diseases gives a small description of all the tropical diseases, but does not state to which countries they may be restricted.

The diagrams are numerous and explanatory; but some of the information is rather elementary and brief. Chlorination for instance is given a short page, and the indicator advised for free chlorine is zinc chloride and starch paste. This is surely a mistake. There is no mention of the nature of the colour reaction.

A book of this kind is not easy to write or easy to criticise. If the present work were amplified with many more practical details and a good chapter or two on rural minor sanitary engineering, it would in our opinion better fulfil its purpose.

DISEASES OF THE INTESTINES.—By A. P. Cawadias, M.D. (Paris), M.R.C.P. (Lond.). London: Baillière, Tindall and Cox, 1927. Pp. xiv plus 300, with 36 figures. Price, 16s. net.

In this book the author takes 'the syndrome' as the basis for the study of intestinal morbid reactions, claiming that the physiological and pathological processes can thereby be the better understood and that needless repitions are avoided. It is with regret that we are unable to recommend this volume for general reading, though doubtless the specialist will derive benefit from its perusal. There is a tendency to prolixity but worse than this is the author's habit of attaching long names of Greek or Latin origin to symptoms or groups of symptoms. We had hoped that medical terminology was moving towards simplification, and it was with something akin to dismay that we beheld combinations such as 'dysaporophetic liporrhœa' and 'the toxoneurotic spasmodico-myxorrhœic syndrome' to mention only two outstanding examples.

Of errors we detected few. On p. 21 'cellulosis' instead of 'cellulose' is attributable to the printing-room: of similar origin is the statement on p. 66 that the cysts of *E. histolytica* measure 7-12 $\mu\mu$ in diameter: 7-12 μ is obviously intended. In the treatment of cholera the author states that isotonic saline is as efficacious as the more usual hypertonic solution. In the section on intestinal worms we did not observe any reference to the use of carbon tetrachloride in the treatment of hookworm. There is a useful bibliography and index.

J. M. H.

AIDS TO TROPICAL MEDICINE.—By Gilbert E. Brooke, M.A. (Cantab.), L.R.C.P. (Edin.), D.P.H., F.R.C.S. Third Edition, Revised. London: Baillière, Tindall and Cox, 1927. Pp. x plus 228, with figures 30. Price, 4s. 6d. net.

This little volume gives in compact form the salient features of tropical medicine. It is not intended to replace the larger standard works on tropical diseases, but where it is desired to refresh the memory on the outstanding features of any of the commoner tropical ailments it will undoubtedly be found useful.

There is little to criticise in the work. Several of the recent advances in tropical medicine such as the Tomb treatment of cholera, and the use of Bayer 205 in trypanosomiasis do not, however, find a place. Napier's aldehyde test in the diagnosis of kala-azar is not referred to, and the bed-bug is still regarded as the most probable intermediate host in this disease. We would like to point out also that chaulmoogra oil is not obtained from the seeds of *Gynocardia odorata* but from those of *Taraktogenos Kurzii*—a fact established by Sir David Prain twenty-six years ago.

This book, like the other manuals of the 'Aids' series, has a rôle of definite value if used in the proper way, viz., not as a source of the minimum essential knowledge requisite for examination purposes, but rather as a refresher after the broad basic principles have been grasped by a study of one of the larger works, together with clinical teaching.

J. M. H.

RESEARCHES ON THE PARASITOLOGY OF PLAGUE. —By L. Fabian Hirst, M.D. (Lond.). City Microbiologist, Colombo. Printed by the Times of Ceylon, Company, Ltd., Colombo, 1927. Pp. 455.

This volume, printed and published by the Colombo Municipality Department of Public Health, brings together in a convenient form the results of the researches on the parasitology of plague which the author has already made familiar to those interested in this disease. In consists mainly of reprints of articles already published by Dr. Hirst in the *Ceylon Journal of Science* during the last two years, and is an expansion of the author's paper in the *Journal of Hygiene* in 1925 (Plague Fleas).

Probably no other disease has been the subject of so much historical comment; from biblical times onwards it has dealt out death impartially. From early times the disease in man has been sufficiently connected with prior epizootics amongst rodents to excite contemporaneous attention. But it is tragic to think that the reasonably exact knowledge of the factors governing the spread of plague which is required for its control should only have become available towards the close of the latest and greatest of the pandemics which have swept through the known world so many times during the ages.

That rat fleas were possibly the vectors of plague from rat to rat was first propounded by Ogata in 1897.

Glen Liston and the Plague Commission in India established the rat flea theory of transmission, both from rat to rat and from rat to man, on a firm foundation.

Hirst in 1912 discovered what was then a newly described species of *Xenopsylla (astia)* in Colombo. In 1914 Rothschild showed that the three species of *Xenopsylla (cheopis, astia,* and *brasiliensis)* occurred on rats in India and emphasised the importance of an accurate

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knowledge of flea species for a successful attack on the prevention of spread of plague. Hirst followed up his first observations in investigating the comparative distribution of *Xenopsylla cheopis* and *Xenopsylla astia* in Colombo and Madras; *astia* is the predominant rat flea in these cities and he found it to be an indifferent vector of plague. The introduction of plague into Colombo he found to be contemporaneous with the appearance of *Xenopsylla cheopis* which he presumes to have been introduced with infected grain from Rangoon. In the plague-infected areas of Colombo *cheopis* is abundant. Hirst's contention is that plague-free areas in India and Ceylon probably have as the predominant rat flea *Xenopsylla astia*, and in these areas the rats show a high susceptibility to plague. These views opened up an important line of work which has been developed in India mainly by Cragg, Taylor and Chitré, and lately by Dunn and Mital. Cragg's preliminary observations supported Hirst's contention, but his lamentable death prevented the completion of what would have been a very valuable contribution to the problem. Cragg expressed the opinion that "the liability to severe epidemics of plague in these regions in which *cheopis* is the predominant rat flea, and the absence of such epidemics in regions where *astia* is predominant, seems fairly clear."

Taylor and Chitré, experimenting in Bombay, found that *Xenopsylla astia* was an efficient vector of plague from rat to rat, though not as efficient as *cheopis*. Under certain conditions obtaining in India therefore *Xenopsylla astia* might act as a vector in Nature, but where *astia* is predominant and where the climate is warm and moist all the year round, e.g., Madras Presidency, its activities and life are probably restricted. In other parts of India, however, where there are greater variations in climate, it is possible that climatic conditions at certain parts of the year may obtain which are favourable to *Xenopsylla astia* becoming a vector, both of rat plague and human plague. The latest work done is that of Dunn and Mital in the United Provinces. Their findings in some respects are in contrast with the earlier findings of Cragg in the same province; though roughly they agree in the main. The map of flea species distribution prepared by Mital shows a zone of over 50 per cent. *cheopis* adjacent to the hills, 40 per cent. *cheopis* further south, 30 per cent. further south still, and a zone of 10—25 per cent. *cheopis* on the southern borders. This corresponds roughly to the incidence of plague in the United Provinces as depicted by Norman White's map. But examined particularly there are many findings showing that these statements are true only in a very general sense. Thus villages only two miles apart show wide differences; high plague incidence does not correlate with high *cheopis* prevalence. Places both suffering severely from plague may have widely different *cheopis* figures, both large and small. Climate alone does not account for the distribution, but subsoil water and ground moisture influence distribution and seasonal prevalence. This is no real correlation between plague incidence and species distribution. It would appear that *astia* as a vector is a distinct epidemiological factor. It can exist at higher temperatures and with less humidity than *cheopis* and may thrive under a wider range of climatic conditions than *cheopis*. The factors determining the irregular distribution of plague in Northern India are many and varied and not distinctly understood. More work on the lines of Dunn and Mital's investigations is required.

While not at the moment propounding anything new, Dr. Hirst gives an excellent chronological description of the work that has been done in plague transmission, discusses the deductions that may justifiably be drawn from our present knowledge, points out defects in our knowledge, and indicates lines for future investigations. The bibliographies are good, though the want of an index is felt. The printing, paper, and binding are excellent; and we look forward to Dr. Hirst's second volume.

A. D. S.

Annual Report.

ANNUAL REPORT OF THE GOVERNMENT GENERAL HOSPITAL, MADRAS, FOR 1925. BY LIEUT.-COL. M. N. CHAUDHURI, I.M.S., ACTG. SUPDT. MADRAS, GOVT. PRINTING. PRICE, RS. 8.

As usual, this report is characterised by the interesting volume of cases of clinical interest recorded in it, for whilst the first half deals with hospital administration and statistics, the second is a series of reports from the different physicians and surgeons of the cases of special clinical interest during the year.

In all, 67,689 out-patients and 9,916 in-patients were treated during the year. Malaria accounted for 9,630 patients treated, either as out-patients or in-patients; 9,699 cases were of diseases of the digestive system; and 7,118 of diseases of the respiratory system. Injuries were responsible for 8,173 cases, whilst dysentery (2,819 cases), syphilis (2,449 cases), and gonorrhœa (2,657 cases) are responsible for much of the sickness treated. There has been a steady increase in the number of malaria cases treated since 1919. Two hundred and fifty-one students were given clinical instruction during the year, and 54 nurse-probationers received instruction. During the year 27 applications were received from women desirous of joining the hospital as Indian nurse-pupils.

Apart from Government grants the main sources of income of the hospital are; fees from paying patients, Rs. 33,371; hire of the motor ambulance, Rs. 649; sale of garden produce, Rs. 113; and sale-proceeds of unserviceable articles, empty tins, etc., Rs. 1,085. This is in addition to the Government grant of Rs. 2,84,866 for salaries and Rs. 3,61,124 for other purposes. The total expenditure was Rs. 6,80,123, and the hospital has 528 beds with a daily average in-patient rate of 498. An interesting innovation towards the end of the year was the installation of an ice manufacturing plant in the hospital, capable of turning out 250 lbs. a day. At present the cost of ice per month used in the hospital is Rs. 291; with the new electrically driven plant it is hoped to turn out all requirements at a cost of Rs. 40 p. m. That the hospital is most economically administered is shown by the fact that with an average daily out-patient attendance of 482, and a daily average of 498 in-patients, the total average cost per day under all heads amounted to only Rs. 659. The average cost of diets was 9 annas 5 pies daily for Indian patients, and Re. 1-0-3 for Europeans.

An interesting feature of the annual reports of the old established Madras Government Hospital are the two historical tables included in the report. The first shows that in 1862 the total European patients treated numbered 1,790, and Indians 2,085; whereas in 1925 the corresponding numbers were 6,168 and 71,437. These figures give some measure of the rate of progress in medical relief in the presidency cities of India during the last sixty years, and some indication of what may happen in the future as the wealth of the country increases. The second table gives a list of all medical officers of the institution since 1830, and includes a series of what are now very illustrious names.

Turning to the professional side of the report, there is much here of interest, and we take the following abstracts from it.

Major G. E. Malcolmson, M.D., I.M.S., Acting First Physician, reports the following (amongst other) cases:—

An unusual case of cerebral malaria.—R. V. T., æt. 23, student, was admitted on 5th November 1925 for fever, drowsiness and inability to talk. According to the history of his friend who brought him to the hospital, the patient suddenly developed fever on 1st November 1925 which subsided on the administration of some quinine, and he was apparently well on 2nd November 1925. But on 3rd November 1925 the fever recurred with distinct shivering, and the administration of quinine

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Intestinal Disinfection

in Diseases of the Nervous System

A GENERATION ago, the origin of diseases of the nervous system presented for the most part a tangle of insoluble medical problems. The scientific worker of to-day, however, has so far cleared a way through the jungle as to make its ultimate conquest a certainty. In disorders of the nervous, as of other bodily systems, the overwhelming part played in causation by toxic substances circulating in the blood has become generally recognised.

The following extract is taken from the matured opinion of a well-known neurologist :—

"There is good reason to suppose that a common link exists between such apparently distinct clinical maladies as migraine, petit mal, epilepsy, various forms of mental excitement and insanity. In other words they may be in the long run attributable to manifold toxæmic agencies. The first routine duty of the physician called upon to face nervous symptoms in which there is no known cause, such as arsenic, lead or alcohol, is to search for a focus of infection. In some cases, this will be found in the nasal cavity and its accessory sinuses, or in the mouth or pharynx, but in the great majority the seat of mischief lurks in the bowel. Should constipation and anæmia be associated with otherwise obscure nervous symptoms, there need be little hesitation concerning the diagnosis, and still less about the treatment. Bowel toxæmia proclaims itself in the boldest of type and the experienced physician often recognises auto-intoxication at a glance. Happily, in all such cases now that the problem of intestinal disinfection has been solved by the introduction of the new benzene derivative Dimol, it is possible to clear out the immediate cause of the trouble in situ. The next indication is to renovate, so to speak, the blood supply by the administration of tonics, suitable diet, exercise and fresh air."—*M.D. (Edin.), Cavendish Square, W. 1, June 2, 1922.*

A NEW Era in the treatment of many diseases of the nervous system is thus opened up by the discovery of this benzene derivative.

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"Tests made for us confirm a co-efficient of 35·0 and the freedom from toxicity claimed by the manufacturers."—"Lancet," April 9th, 1921.

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had no effect and the patient was observed to have become drowsy and not talking. Slight twitchings of the muscles all over were also noticed about this time.

At the time of admission on 5th November 1925 patient had a temperature of 101°, was in a semi-stuporose condition, apparently oblivious of his surroundings, unable to talk or understand direction. But he was not entirely unconscious, for when disturbed to make the necessary physical examination, he would look round in a dazed sort of way and sit up or lie down of his own accord. Slight tremors of the lips and fingers were noticeable. Examination revealed slight rigidity of all the muscles, particularly on the right side, slight ptosis of the left eyelid; the knee jerks were brisk on both sides, but more on the right. Abdominal reflexes were sluggish. Plantar reflexes were flexor. Motor and sensory functions could not be investigated. The pupils were slightly contracted but equal and reacting to light.

There was no history or evidence of any trauma or middle ear disease. Heart sounds were normal, other systems too, normal.

Examination of the blood revealed a well-marked leucopenia, and repeated examination failed to show any malarial parasites.

At 12-30 p.m. on 6th November 1925 the patient had a Jacksonian fit lasting about 3 minutes. He had another fit at 3 p.m. the same day.

Seven grains of acid quinine hydrochloride were administered intravenously the same afternoon and repeated the next morning with rapid amelioration of the symptoms. After the third injection of quinine the patient had completely recovered, temperature remained normal, and patient was able to talk and understand speech. He did not remember anything that had happened during the three days of his unconsciousness. The injections were stopped and quinine was administered to him orally and the patient was apparently all right until 18th November 1925 when he got a rigor and sudden rise of temperature to 104°. Blood examination again failed to show any parasites, but the fever subsided on an intravenous injection of quinine. He was given two more injections and afterwards had an uneventful recovery. This was evidently a case of malignant tertian malaria which had affected the central nervous system in a manner not hitherto observed.

A case of Diabetic Coma in a boy of ten.—M. D., æt. 10, school boy, was admitted on the evening of 12th November 1925 for dyspnœa and pain in the chest. The only history which could be gathered from the relatives was that the boy was apparently in good health till the evening of 12th November 1925 when he was suddenly seized with difficulty of breathing and so was taken to the hospital. This attack lasted for over an hour and he was comfortable for the rest of the night. In the morning he had another attack lasting for half an hour. He had again another attack at 10 a.m. and another still at 12 noon. During these attacks, he showed marked air hunger, hyperpnœa and pain in the abdomen. A catheterised specimen of the urine showed: specific gravity 1028 with a trace of sugar but no albumin or ketone bodies. The patient was too bad for any investigations to be made on his alveolar air or his blood sugar. He was given straightaway 10 units of insulin at 12 noon with another 10 units at 2 p.m. Bowels were freely opened by means of enema, and glucose and soda bicarb. administered by mouth. He had no attacks after the second dose of insulin. Blood sugar, estimated 20 hours after the second dose of insulin, showed the rather high percentage of 0.16. Patient made a good recovery.

On 20th November 1925 the patient was found to have developed a pityriasiform rash all over the body without any rise in temperature. No apparent cause could be found for the rash and it disappeared completely in three days' time without any treatment.

In this connection it may be mentioned that two cases of diabetes mellitus were admitted into the wards in a comatose condition where the onset of coma was precipitated by an attack of fever. Both were old men, long-standing cases of diabetes mellitus observing strict diet, and the only reason that brought on the coma was an attack of fever.

Both were put on energetic treatment: and one recovered; but the other, which was complicated from the onset with very bad intestinal paralysis and meteorism, succumbed.

Another interesting case was unilateral diabetic neuritis resembling anæsthetic leprosy.

A case of amœbic abscess occurring in the left lobe of the liver and bursting into the left lung.—M., aet. 36, European, planter, was admitted on 9th December 1925 with a history of irregular fever, cough, and spitting of blood. He did not give any previous history of lung trouble of any sort, but admitted he had had colitis in the beginning of the year for which he took 2 injections of emetine, and the condition improving, he dropped it off. The present complaint started with pain in the left shoulder and left side of the chest about 3 months ago. The pain was worse when he lay on his left side. Later on he began to cough, bringing up blood-stained sputum which gradually increased in quantity, and on his admission into the hospital on 9th December 1925 he was found to be continuously coughing, bringing up copious amounts of expectoration deeply mixed with blood. He was running an intermittent temperature ranging between 101° and normal. Physical examination of the chest showed the whole left base absolutely dull without any breath sounds in that area. *X*-ray examination on 16th December 1925 showed a patch of opacity involving the left base with the left diaphragm pulled up. Wassermann reaction of the blood was negative. Repeated examination of the sputum failed to show any tubercle bacilli or evidence of malignant growth or broncho-spirochætosis. On 25th December 1925 the patient was put on hypodermic injections of emetine hydrochloride one grain a day. There was immediate improvement in the condition of the patient: the temperature, cough and expectoration diminishing markedly. After the 4th day of emetine therapy, the temperature remained normal throughout, and the expectoration was almost nil. He was given 6 more injections of emetine, making a total of 10, and then *x*-rayed again, when his left base appeared much clearer. His improvement was steady and uneventful and when discharged on 11th January 1926 he was found to have increased in weight by a stone. This was evidently a case of amœbic abscess occurring in the left lobe of the liver and bursting into the left lung. The colitis he said he was suffering from in the beginning of the year was really amœbic dysentery, the careless handling of which brought about the hepatic abscess.

Encephalitis Lethargica in South India.—That encephalitis lethargica is far from rare in South India is shown by the number of cases exhibiting the sequelæ of this disease, who are admitted to the General Hospital, Madras. The acute form is less commonly seen.

Hindu, male, student, age 16 years. Complained of fever and headache with pain all over the limbs for 3 days. He gave a history of malaria 6 months previously, and recurrent precordial pain which used to go on month after month lasting an hour or so and accompanied by giddiness. The present illness began 10 days before admission. When he was walking in the streets of Madras he felt dizzy, sat down on the side of the road, and was brought home unconscious by some friends. This unconscious condition lasted for about one hour and since then he has had three or four similar attacks. He has had no convulsions. For the last three days he had continuous fever with headache but no rigor. He complained of pain generally throughout the joints. On admission he was found to be in a lethargic condition, but capable of being aroused and of giving sensible answers when questioned. His blood was repeatedly negative to malarial parasites and his temperature, which was on admission 102.6°, came down to normal in a few days without the administration of quinine. On examination, his deep reflexes were distinctly brisk, the abdominal reflex was absent on the left side and the plantar response was flexor. His pupils were dilated, the left being more so than the right, and sluggish to

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light. There appeared to be some paresis of the left external rectus muscle and there was some ptosis on the same side. Otherwise his cranial nerve functions seemed normal. Sensation appeared to be normal all over. Kernig's sign was described as being slightly present on the left side. On lumbar puncture, the cerebro-spinal fluid was perhaps under slightly increased pressure. Microscopically a few red blood cells and polymorphonuclears were found in the sediment. The albumin was 1 per cent. No specific organism could be isolated. The patient made an uninterrupted recovery and was discharged after a stay in hospital of four weeks apparently perfectly cured.

The following cases are reported by Dr. M. R. G. Mudaliyar, B.A., M.D., C.M., Fourth Physician:—

Gumma of the Spleen.—A Muhammadan male, aged 35, was transferred to the ward from the surgical side on 1st July 1925 with an enlarged spleen and a low temperature. The spleen extended as far as the umbilicus (6 inches below costal margin) and 1½ inches to the right of the mid-sternal line. A tender area over the middle of the spleen with apparent fluctuation was explored by the surgical side with a syringe, but no pus was found and so he was transferred to medical. The patient gave a previous history of malaria, and was given a course of quinine treatment, with intravenous neutral iodine, and *x*-ray exposures for the spleen, but with no reduction in the size of the organ. The Wassermann reaction was found to be positive. Hence given a course of neosalvarsan injections. After the first injection the spleen began to decrease in size rapidly and when the patient was discharged on 6th August 1925, the spleen was only 1½ inches below the costal margin in the left nipple line. From the response to treatment and tender spots in spleen, one is led to believe the case to have been really a syphilitic spleen—probably gumma.

Cyst of the spleen.—A Hindu male, aged 23, was admitted to the ward on 8th July 1925 with a large tumour in the abdomen, mainly on the left side, extending below as far as the iliac fossa and to about 3 inches to the right of the mid-sternal line. It was fluctuating and the edges were rounded. A cyst of the spleen was suspected and the case transferred to the surgical side for exploration and treatment. On opening, a large cyst containing brownish fluid was found arising from the spleen. The splenic tissue was flattened and adherent to the cyst. The cyst along with the spleen was removed.

Syphilitic myelitis.—A Muhammadan male, aged 40, was admitted to my wards on 26th September 1925, for inability to use lower limbs and retention of urine.

Nervous system.—Pupils active, grips equal on both sides, abdominal and epigastric reflexes present on both sides. Complained of girdle pain about the level of the posterior superior iliac spine. The right lower limb lying helpless on its outer side. It was slightly warmer than the left. Knee jerks and Babinski's signs absent on the right but present on the left. Flexor plantar response on the right side. Sensations normal on both sides. Cremasteric reflex present on both sides. The whole trouble started 20 days previously with pain and stiffness of the 3 outer toes of the right foot. Then pain over the right limb and then girdle pain at the level of the posterior superior iliac spine. Then inability to use the right limb and later on inability to pass urine set in. Had intense pain over the first lumbar spine.

Wassermann reaction positive (strong). A course of neosalvarsan given and after the first injection the symptoms improved considerably. After the second he was able to walk, and to pass urine voluntarily.

Lieutenant-Colonel E. W. C. Bradfield, M.S., I.M.S., First Surgeon, reports as follows:—

The following table taken from the wards of seven surgeons shows the increasing amount of gastric surgery that is being done at the General Hospital. Many of these patients were a very poor operative risk and the operative mortality rate is not excessive. With increasing experience, especially in nursing, our own figures have shown steady improvement, but it is still very difficult to carry out thorough pre-operation treatment amongst Indian patients. We have entirely given up the Fowler position after operation except for lung complications, and as a result the patients are happier, their convalescence is easier, post-operative vomiting is less, and we have practically eliminated those deaths from cardiac failure upon which we commented in a previous report. The operations have been mainly gastro-enterostomy. We do not feel justified in performing partial gastrectomies for gastric ulcers on the poor material (physically) which comes to an Indian hospital, and though we have not been able to do any follow-up work this year the increasing numbers of these patients seeking admission and who now often demand an operation, would seem to justify fully our practice.

	Total number operated on.	Mortality.
1918	8	2
1919	6	1
1920	9	2
1921	12	0
1922	118	10 (8.4 per cent.)
1923	208	29 (13.9 do.)
1924	199	22 (11.0 do.)
1925	259	19 (7.3 do.)
TOTAL	819	85

Table B shows the sites and characters of the ulcers found at operation.

1. Ulcers of Duodenum—		
First part	527	..
Junction of 1st and 2nd part	33	..
Second	4	564
2. Ulcers or stenosis of Pylorus (These are probably all duodenal.)		126
3. Ulcers of the stomach—		
Lesser curvature	36	..
Greater curvature	4	..
Anterior surface	10	..
Posterior surface	10	60
4. Ulcers not classified		24
5. Multiple ulcers (i.e., found in both stomach and duodenum)		17
6. Cancer of stomach—		
Pylorus (1)	17	..
Lesser curvature	5	..
Cardiac end	1	..
Not classified	2	25
7. Growths (Cancer) of duodenum		2
		818

(1) Some of these not submitted to pathological examination were probably inflammatory.

Six duodenal ulcers and two pyloric ulcers were described as perforated. Perforation does not appear to be a common complication among Indian patients.

Appendicitis.—In a former report, we commented upon the increasing prevalence of this disease amongst Indians, and the following table shows the admissions during the year:—

	Chronic.	Acute.	Total.
Hindus	48	4	52
Muhammadans	5	..	5
Indian Christians	17	..	17
Anglo-Indians	3	..	3
Other castes	1	..	1
Europeans	18	6	24
	92	10	102

Tetanus.—In the past two years, 63 patients were admitted for this disease, among whom only 36.3 per cent. were cured. Treatment has generally been too late and our isolation sheds are very unsuitable places in which to treat this and in fact any contagious disease.

Fractures.—A review of the types of fracture met with among Indian patients has proved very interesting

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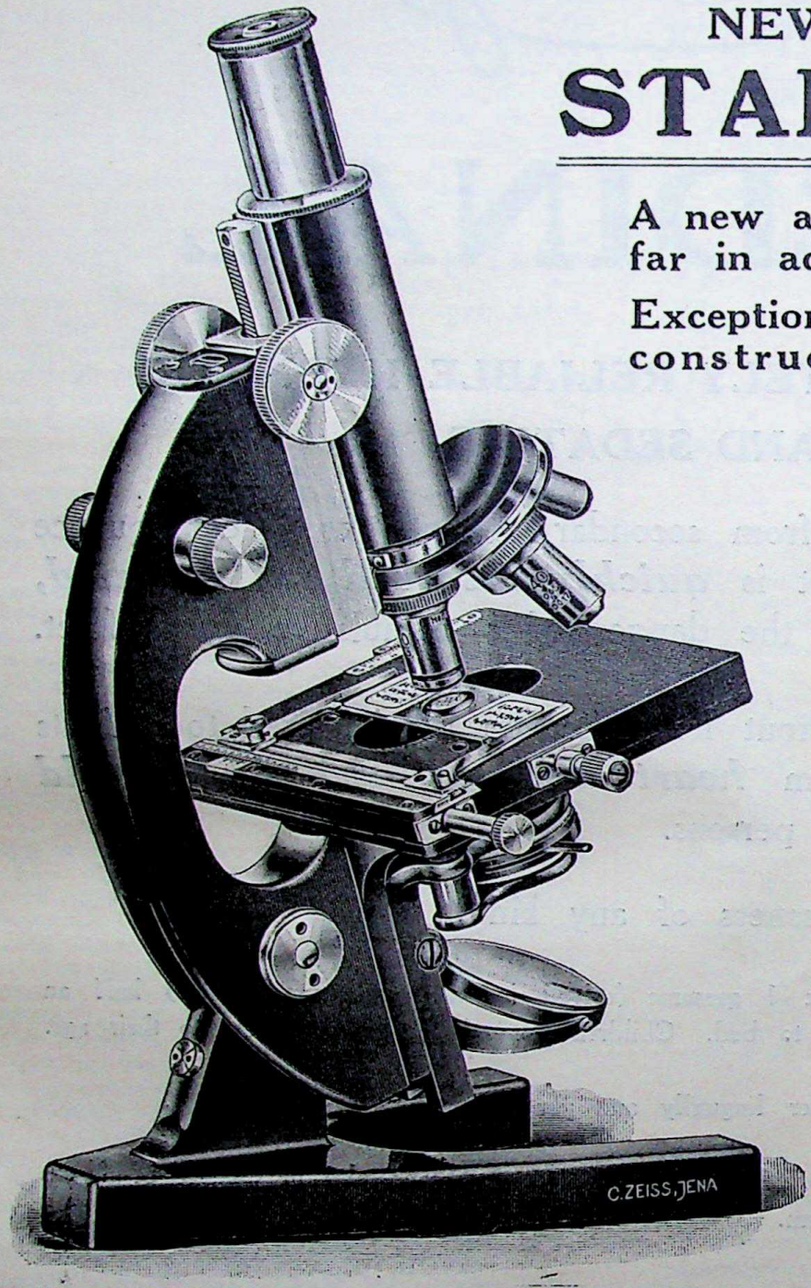

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and the incidence of fractures of the lower extremity, since all are admitted, is reproduced. Why is Pott's fracture so rare amongst Indians? Is it because of their footwear or because there are no curbs on Indian pavements?

———	1923.	1924.	1925.	Total.
Fracture pelvis	5	4	3	12
Fracture femur (neck of femur). Extracapsular fracture neck of femur, including fractures of trochanter	20	34	23	77
	..	3	2	5
Fracture shaft of femur	35	33	33	101
Fracture lower end	1	..	4	5
Fracture both bones leg	29	45	45	119
Pott's fracture	3	1	6	10
Total ..	93	120	116	329

Major K. G. Pandalai, M.B., F.R.C.S., I.M.S., Second Surgeon, reports as follows:—

Anæsthesia.—Chloroform administered through Junker's inhaler is still the mainstay in the great majority of the cases. The risks of chloroform inhalation are constantly before our eyes and one death occurred which is directly attributable to its effects on the heart. Further accidents have been prevented by the timely use of adrenalin hydrochloride, 1 : 1,000, injected directly into the heart. This was employed successfully in three cases. During an operation for harelip on a girl of seven the pulse disappeared and did not return for seven minutes in spite of oxygen inhalation, artificial respiration and rhythmical cardiac compression. 1 c.c. of adrenalin, 1 : 1,000, was then injected directly into the heart and in about twenty seconds the heart beats returned, followed very soon by respiratory movements. The operation was continued and the child was discharged cured after 10 days.

In a second case of an infant of three years in whom a piece of metal had been impacted in the upper end of the œsophagus for nine days, the heart and respirations stopped for nearly ten minutes at the very commencement of the anæsthesia and oxygen and artificial respiration were fruitless. An injection of 1 c.c. adrenalin into the left ventricle with rhythmical compression of the heart from without caused a return of the heart beats in about a minute. The child was in too bad a state for further manipulation and was returned to bed with a rapid but regular pulse and respiration. Twelve hours later the child died. Immediate death on the table was averted undoubtedly by adrenalin. In a third case of tubercular cæcum associated with enlargement of the spleen in a Hindu male, age 32, the abdomen had just been opened when the anæsthetist reported arrest of the heart and respirations. Oxygen and artificial respiration were unsuccessful for five minutes; an intra-cardiac injection of 1 c.c. of adrenalin hydrochloride into the left ventricle in the fourth left inter-costal space close to the left border of the sternum, followed by cardiac massage between one hand over the pre-cardiac region and another hand under the diaphragm, soon restored the heart beats. The contemplated operation of transverse ileo-colostomy was successfully completed and the patient returned to bed in good condition, but twelve hours later he developed pulmonary œdema and died.

Splanchnic anæsthesia.—In cases in which the patient's condition precludes a general anæsthetic, a combination of abdominal field block with anæsthetisation of the splanchnic nerves by the method of Kappis (deep injection of novocaine 1 per cent. 25 c.c. below the centre of each 12th rib) is most useful in upper abdominal surgery. This has been employed in a number of cases of gastro-jejunostomy for duodenal ulcers and cholecystostomy the operations being completed without shock.

Sacral anæsthesia is being employed in cystoscopic work. This consists in the injection of 30 c.c. of 1 per cent. novocaine solution into the extradural space of the spinal canal through the sacral hiatus, the patient being placed on his face with the pelvis raised on pillows. The method is reliable, and although it involves waiting for nearly twenty minutes after the injection is made, there have been no failures.

Syphilitic disease of the cervical vertebræ.—An adult Hindu male, age 32, was admitted for pain and rigidity of the neck of three years' duration. His general condition was good, there was no rise of temperature and all organs were normal. There was a history of syphilis ten years ago. His Wassermann reaction was strongly positive. *X*-rays showed disease of the second and third cervical vertebræ. Anti-syphilitic treatment rapidly improved the condition and the patient was discharged cured and able to move his head in all directions. He returned to his duty as an office peon.

Extra pleural thoracoplasty.—Two cases of tuberculosis of the lungs were treated by this method. In both, artificial pneumothorax treatment had been tried unsuccessfully at the Tuberculosis Hospital in Royapetta, and the cases were referred to me as unsuitable for pneumothorax treatment on account of difficulty in injecting the air from the presence of dense pleural adhesions. Both patients were young adults and their general condition was fair. Sauerbruch's J-shaped posterior incision was employed and the operation done in two stages. Portions of all ribs excepting the last were removed commencing from below. The total length of rib excised was 35 to 40 inches in length and the pieces were cut off as close as possible to the spine. In one case para-vertebral inter-costal anæsthesia with ½ per cent. novocaine solution was solely employed, the injections being made into the inter-costal spaces close to the spine in series on the affected side. Anæsthesia was satisfactory. In the second case chloroform inhalation was employed without detriment to the patient. In both cases apical cavities had been demonstrated by the *x*-rays and bacilli were present in the sputum. The disease on one side was advanced but stationary and on the other the process was only in the initial stage. The first case, done 10 months ago is now well, has put on weight, and is keeping good health. Cough and fever have disappeared. In the second case, done 6 weeks ago, there is marked improvement in the cough and pyrexia.

Gastric and duodenal ulcer.—The number treated was 102. The age of patients varied from 20 to 45. The proportion of males to females was 1.5 : 1. Every community is represented. The general condition was on the average poor and average weight of patients on arrival was 90 lb. Diagnosis is easy and made principally on the history. *X*-rays and test meals are only exceptionally employed. In two cases ulcers were present both in the stomach and duodenum. The clinical diagnosis has been correct in 93 per cent. of cases and in the others, such conditions as early hepatic cirrhosis, chronic appendicitis, cholecystitis, tubercular peritonitis, and tuberculosis of the intestines have been found. Rarely ulcer patients have had co-existing diseases such as diabetes, tuberculosis of the lungs, intestinal worms, and severe anæmia. Pyorrhœa alveolaris is present in 30 per cent. of cases. In three cases giving ulcer histories, laparotomy disclosed no obvious pathological lesion and the abdomen has been closed after removal of the

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appendix. Temporary relief followed the operation, but the patients have returned from 6 to 12 months later with a return of symptoms. A second laparotomy has then disclosed the presence of a well marked duodenal ulcer and a gastro-enterostomy has then cured the condition. Two possibilities are present to explain these cases (*a*) that ulcers were present but were missed at the first operation; this is unlikely, for with the experience already gained, there is no difficulty in recognizing an ulcer if it is present, (*b*) that the symptoms of dyspepsia in these cases are due to functional errors of secretion and motility which without producing specific palpable changes, antedate their development by many months. This second explanation seems to be the more probable one. If such is the case, it follows that the classical symptoms of ulcer are late manifestations of the disease, which in the beginning is an error of gastric function, curable by medicinal and dietetic measures. Although gastro-enterostomy cures duodenal and gastric ulcers in the majority of the cases, yet a certain percentage of them continue to have the symptoms, although much relieved by the operation, and in these cases the causative factors whatever they may be, whether hereditary, toxic or endocrine in nature, continue to operate, and unless the surgical treatment is followed up by medicinal and hygienic measures permanent benefit cannot be assured. These, the ordinary hospital patients are unable to carry out after return to their home surroundings and this accounts for the recurrence of the symptoms in a number of cases. There has been only one case of gastro-jejunal ulcer operated upon during the year. In this case the original operation had been performed by another surgeon, and on resecting the original anastomosis a piece of silk was seen hanging loose in the base of the ulcer.

In three cases of old standing ulcers which had produced much deterioration of the general condition of the patient, gastro-enterostomy or partial gastrectomy had been performed. Following the operation, these patients developed a severe degree of anæmia with œdema of the feet and face and ascites. This anæmia was absent before operation. The urine was normal and the motions contained no parasites. All organs were normal. The cause of the anæmia developing so soon after the operation is difficult to explain. This condition persisted in spite of treatment for as long as six months when the patients were lost sight off.

The mortality in this list of 102 cases was 8.8 per cent. and was accounted for by peritonitis 3, lung complications 2, shock 4 cases.

It is known that an ulcer may perforate even after a gastro-enterostomy has been performed. Two such cases occurred during the year. The ulcer itself had not been dealt with in any way at the original operation.

As regards the technique employed, a right paramedian incision along the inner border of the right rectus, whose fibres are split, is generally employed. Catgut solely is used and no clamps are employed for the anastomosis. A large-sized opening about 3 inches long is always made in the stomach. The incision in the stomach is generally vertical, and the highest available part of the jejunum without undue tension is chosen for the junction. Rarely when the stomach is small or comparatively immobile, an oblique and occasionally a transverse incision is made. The appendix is also removed in about 75 per cent. of the cases, and in a small number the gall bladder, if showing signs of disease, is also removed at the same time. The abdomen is closed with through silk sutures.

A case of simple œsophageal stricture.—Simple strictures of the œsophagus are known to follow the swallowing of caustics, but a case supervening a short time after an attack of cholera has not been reported. The patient suffered from Asiatic cholera 14 months ago. About two months after his recovery, he noticed some difficulty in swallowing solids and sought admission into this hospital, when slight stricture of the œsophagus was diagnosed. It was easily dilated by the passage of bougies and the patient was discharged cured. He returned a year later complaining of difficulty in swallowing even liquids, and he was much emaciated, weighing only 84 lb. Even the finest bougie could not be passed, the obstruction being located 12 inches from the teeth. A bismuth meal disclosed a tight stricture through which the emulsion slowly trickled, the œsophagus above its level being dilated. The œsophagoscope revealed a very tight stricture through which no bougie could be negotiated. A gastrostomy was performed and the patient fed through a tube, the food consisting mainly of milk and soft foods for a fortnight. His general condition improved greatly. Ten days later a second attempt was made to pass a bougie through the œsophagoscope; this attempt also failed. The patient was then given a long piece of silk No. 1 to swallow slowly at leisure and in 24 hours he had swallowed about a yard. Through the gastrostomy opening a crotchet hook was introduced into the stomach and the end of the thread fished out by the patient himself. Increasingly larger sizes of silk were tied to the upper end of this silk and drawn out through the gastrostomy opening until in a few days it was possible to pull through the stricture a short piece of No. 6 soft rubber catheter, which was then left in. Through this tube, whose upper end terminated just above the stricture and the lower end was in the stomach, feeding by mouth with fluids was possible. Larger sizes of rubber catheter were then drawn through the stricture and left in for periods varying from 24 to 72 hours, until in about ten days it was possible to pass through the stricture the smallest sized olive-headed bougie we had in stock. We then realized that the patient had not one but two strictures at a distance of one inch from each other. Gradual dilatation was carried out until the largest bougie could be passed easily by the patient himself. The gastrostomy wound closed spontaneously and had healed before the patient was discharged.

Radiography of the gall bladder and kidneys.—Captain Barnard and I have tried to confirm the experience of workers in the United States of America and England regarding the success of sodium tetra-brom-phenolphthalein in demonstrating gall bladders. Both oral and intravenous methods have been tried. The dose employed is 0.5 gm. per kilo of body weight.

After a preparatory purgative overnight, two capsules containing each 0.2 gm. of the drug are administered orally every 15 minutes until the required dose is administered. Radiographs are taken at intervals of 4, 8, 12, 15 and 18 hours after administration. It cannot be said that the oral method is satisfactory, as it does not always demonstrate even a healthy gall bladder. The intravenous method is reliable, but is more risky. In a case of mine in which the intravenous method was tried, a quiescent focus of tubercle in the lung which was not suspected and which had given no symptoms or physical signs flared up and tubercle bacilli appeared in the sputum, with hæmoptysis and rise of temperature. The results of the intravenous administration are satisfactory as far as demonstration of the gall bladder is concerned.

Good pyelograms continue to be obtained with injections of a 15 per cent. solution of sodium iodide into the pelvis of the kidney through a ureteral catheter. The amount employed is 6 to 10 c.c. for each kidney. No untoward effects have at any time been seen and the drug is reliable.

Captain T. W. Barnard, Radiologist, reports as follows:—

The great and continued increase in the number of patients dealt with by the Institute, together with the installation of new apparatus, requires additional staff and an extension to the building. A scheme for the latter was submitted by the Radiologist and has been approved by the authorities, provision being made in the 1926-27 budget for its completion. The intention is to build another storey over the Clinical Laboratory adjoining the Institute to which the present Laboratory will be moved. The vacated building will then be converted by partitions into cubicles for electrical treatment, this addition giving to the Institute another eleven rooms and cubicles, which are badly needed.

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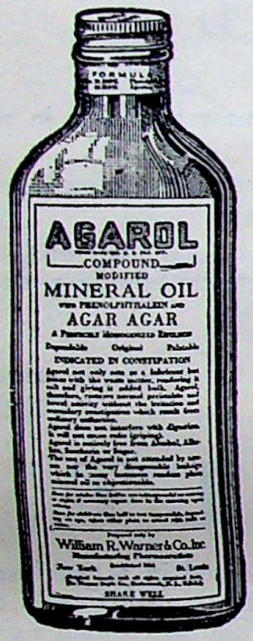

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Exhibitions.—During the year radiographs taken at the Institute were exhibited at the Madras Fine Arts Exhibition and also in London, at the Seventieth Annual International Exhibition of the Royal Photographic Society (Scientific Section).

The specimens shown at the Madras Fine Arts Exhibition were of shells, taken for, and now installed in, the Madras Government Museum. We have now received a request from the Director of the Zoological Survey of India for copies for the Indian Museum at Calcutta.

At the London Exhibition there were 1,300 photographic exhibits from all parts of the world, most countries being represented. Only 78 radiographic negatives, prints, transparencies and micro-radiographs were accepted, 21 specimens being from this Institute; a very good notice of these appeared in *The Lancet* of September 19, 1925. After the Exhibition the Madras radiographs were accepted by the British Institute of Radiology for permanent exhibition in London.

New Apparatus.—During the year a considerable quantity of new apparatus has been installed, in addition to the Deep Therapy *X*-Ray Outfit.

A "Radiostat" High Tension Transformer for diagnosis has replaced the coil set in the Radiographic Room and is giving excellent results with almost instantaneous exposures. The coil set has replaced some old apparatus in the superficial *X*-Ray Treatment Department. A new screening stand has taken the place of the one already in use, which has been transferred to Royapetta Hospital.

Quain Ozonisers have been installed in several of the departments which have thus been provided with a source of "artificial sea air," this keeping the atmosphere of the departments fresh and pure. A "Hospital Set" for treating infected sinuses and other similar conditions is also in use.

Tungsten Arc Lamps and Mercury Vapour Lamps for producing Ultraviolet Rays have been provided, and much benefit to patients has been the result of their use.

A new diathermy apparatus, with which more than one patient can be treated at the same time has just been assembled. This is intended to replace our present apparatus, which eventually will be transferred to Vizagapatam.

Three Sollux Lamps have been obtained and these, combined with *x*-Ray Exposure, are giving good results in cases of deafness.

Three "Whirlpool Baths" are on the way out from England. These will be put into use in the Electrical Treatment Department.

Bismuth meals.—There were 317 cases in which bismuth meals were administered and the medical officers in charge of these patients were considerably helped by the radiographic examinations. When operations were performed, the findings were compared with the *x*-ray results and in the majority of cases confirmed these.

Visualization of the gall bladder.—In collaboration with, and at the request of Major K. G. Pandalai, I.M.S., a supply of the sodium salt of tetrabrom-phenolphthalein was obtained and administered to a few selected cases. Major Pandalai is referring to this work in his report but, briefly, our experience was that when given orally the results were not good. One case was given an intravenous injection of the preparation and a very good picture of the gall bladder was obtained, but the effect on the patient was unsatisfactory. A modification of this method will probably be the one used ultimately unless a more satisfactory drug is discovered which can be given orally.

Thoracic examination.—One thousand one hundred and eighteen cases were radiographed during the year against 503 in 1924. Apart from the routine examination of lung conditions, a number of cases of artificial pneumothorax were dealt with, the radiographic results showing the various degrees of inflation with air, the several stages of collapse of the lung, together with the various forms of adhesions of the pleura to the parietes and the subsequent formation of fluid at the base in particular. All these cases of artificial pneumothorax were radiographed at the request of Dr. Kesava Pai and a series was shown by him at one of his lectures to the medical profession in Madras.

Examination of skull.—During 1925, 353 radiographs were taken, this figure showing a slight increase over that for 1924. The majority of these cases were examined at the request of the Superintendent of the Government Ophthalmic Hospital to elucidate conditions of the pituitary fossa and sinuses, in relation to optic atrophy, sinus infections and tumours. Major Wright is still continuing his research in this direction.

Dental radiography.—The importance of *x*-ray examination of the roots of the teeth, which often show the cause of apparently remote conditions, is being more appreciated by the medical profession. Many cases of rheumatism and indefinite pain have been traced to the root abscess, which but for the *x*-rays would have remained undetected.

The new deep-therapy pavilion.—The new department for *x*-ray treatment of cancer and other deep-seated conditions has not yet been opened, owing to technical difficulties which have now been surmounted. In this pavilion we shall be able to deal with patients requiring deep-therapy for such conditions as cancer, fibroids and tumours. We shall also be able to augment this treatment by radium exposures, as provision has been made in the year 1926-27 budget for a first supply of this costly element, with which so much good can be accomplished. In carrying out this treatment the operators will be exposed to great risks. The apparatus will produce a high tension current of 200,000 to 300,000 volts, the Coolidge tubes used giving off very penetrating *x*-rays and increasing the dangers to the staff.

Correspondence.

PREVENTIVE MEDICINE AND MISSION HOSPITALS.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—One cannot but note with gratitude the increasing emphasis being placed, as apparent in your columns, on the crying need for a policy, especially in the *mofussil*, with respect to preventive measure against disease. Conditions in the district from which I write are, I suppose, as typical as any that 'up-country' hospitals have to contend with. For the most part the standard of living could not be lower than it is, and the monotony of the poverty-disease, disease-poverty cycle is ever with us. For thirty years a service, chiefly on the surgical side, has been provided for the community through a main hospital, from which I write, and a few branches. No one would wish to undervalue what this represents in a district where the only other assistance available for physical ills is the village barber, or, in one or two centres, a small, ill-equipped, and often insanitary village dispensary, or the distant, for many inaccessible, district headquarters hospital. Yet despite great development in the bulk of the work, one cannot help feeling that much of it is futile, because the villagers are untouched by the most elementary ideas relating to prevention and early treatment. The proportion of inoperable cancerous growths is probably as great as ever it was. People from the same villages appear year after year with guinea worm and the deformities resulting from mal-treatment. There is a group of villages in Koilkuntla *taluk*, on whose behalf public health measures have been sought, so far in vain, who regularly supply us with cases of enlarged spleen, usually accompanied by guinea worm ulcers. In some communities there has been a slight improvement with regard to tuberculosis, but still we have the same dismal train of patients with advanced disease, in-patients for a week or so, and then off, often walking, to a distant village. One gets much satisfaction from the successful repair of a vesico-vaginal fistula, but what of the unnecessary

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suffering in the villages, and of the countless cases of mismanagement of normal and abnormal labour? And what can the out-patient officer do for a marasmic child when he knows that whatever advice is given, with the inevitable medicine, mal-nutrition combined with doses of opium will continue in the village?

The blame for this perhaps lies partly on medical mission policy. We have been so engrossed with the pressing claims of hospital routine that no time has been given to attempts at education on preventive lines. At the same time every mission hospital in the country is conscious of this need and is eager to co-operate with Government to the extent that opportunities are given. This is shown by a resolution passed by the Christian Medical Association at its conference at Miraj this year.

"That we affirm our conviction that the time has come for greater relative stress to be laid in medical mission activity on the subject of *prevention of disease*. We believe that every medical mission in India should, in so far as lies in its power, give its unqualified support to movements aiming at the improved health of the community, such as general propaganda work, infant and child welfare, campaigns against tuberculosis, venereal disease, and the abuse of opium. Further, we believe that in regard to many such movements the initiative should be taken by Christian medical organisations, and such work be regarded as an integral part of their work, no less than direct healing."

Something is being done. Some of us, with Association support, are developing child welfare centres. In South India the C. L. S. is publishing cheap vernacular literature on such subjects as malignant growths, tuberculosis, leprosy, guinea worm, conjunctivitis, and the contagious diseases, in a style designed to reach the semi-literate, therein differing from much already available that is often remote from village conditions. Imperfect as the series is, it is at least an attempt to touch one aspect of the problem.

But what impresses one most in *mofussil* practice is the absolute lack of a preventive policy, and the absence of any opportunities of co-operation. No mission hospital has either sufficient funds or adequate staff to carry out a preventive programme of any size. Yet if the money at present wasted by Local Boards and Government in maintaining two, three, or more wholly inefficient dispensaries, in the same small town, were to be utilised in developing one well-equipped central hospital with an organised preventive branch and a child welfare department, in touch with the villages, something might be accomplished.* How often does one see a totally unsupervised village dispensary, under a Sub-Assistant Surgeon fresh from the schools, struggling along in competition with a mission dispensary or hospital, often almost next door? The mission hospital with no resources outside mission funds and a fluctuating fee income, and the Local Fund dispensary with barely enough to keep it supplied with a few drugs and dressings. The result is wasteful of money and energy on both sides and cannot help but be deadening in effect on men practising in isolated and ignorant villages. Competition and monetary considerations tend to take priority over clinical interests, and the good of the patient, and the ultimate good of the people as represented by efforts at prevention is wholly ignored.

Perhaps one reason for public health inefficiency, as it appears to an outsider, is that the Public Health arm is maintained as a separate and water-tight unit. To my mind for an officer attempting to do preventive work, lecturing, etc., to be completely out of touch with the clinical work of hospitals is as undesirable as for the staff of country hospitals to ignore preventive work. I have never known a local Health Officer to consult hospital records, which, one would imagine, would give some indication of where the need is greatest, or to seek the friendly co-operation of the hospital staff. Perhaps this is not surprising, as in a large and scattered district a great part of such an officer's activities are absorbed in cholera and small-pox work. Preventive work of less immediate urgency is simply untouched.

But my point is that it could be touched, even against the weight of economical conditions and the ignorance and prejudice of a district like this, were co-operation to replace competition; were the profession to work wholeheartedly together instead of at cross-purposes; and were Government to realise that mission hospitals are not proselytising agencies, but institutions in which the conception of the aims of medical practice is not content with anything less than the highest. And among the highest ideals of medicine is the idea of the prevention of disease.—Yours, etc.,

ARTHUR H. DRIVER, M.B., Ch.B. (N. Z.).

London Mission Hospital, Jammalamadugu,
Madras Presidency.
26th July, 1927.

[* We once attempted to comment on this problem ourselves, in an editorial on "Dastypore." *I. M. G.* Sept., 1924, p. 455.—Ed., *I. M. G.*]

JOINT SYMPTOMS IN TYPHOID FEVER.

To the Editor, The Indian Medical Gazette.

Sir,—In the Epitome of Current Medical Literature in the *British Medical Journal* of the 18th June, 1927, H. Schaeffer and R. Liegears are said to state that though joint symptoms are not common in typhoid fever they are not extremely rare. They describe three forms: "The first constitutes the arthralgic form of Bazin and Potain which is characterised merely by transient pains in the joints. The second form consists of suppurative arthritis involving several joints. The third form consists of serous polyarthritis resembling acute articular rheumatism." It is further stated that "in very exceptional cases they constitute the first sign of typhoid septicæmia so as to merit the title of arthro-typhoid suggested by Robin and Leredde." The case of a patient aged 46, is cited. His principal symptoms for the first fortnight of the disease were fever and pains in the joints, which were attributed to acute articular rheumatism, although they were not relieved by sodium salicylate. Some of the joints were merely painful, others were red and swollen. It was only between the 15th and 21st day that the typhoid symptoms developed and the Widal reaction was found to be positive. With reference to the above the following case treated in this hospital would appear to be of some interest.

A railway engineer, aged about 28 years, was brought to the hospital on 22nd May, 1927, for fever and severe pains in the joints. The temperature was high, 103—104°F. and the knee joints, ankles and one wrist were affected. The knees were more affected than the other joints. A faint systolic murmur was heard at the mitral area, but this disappeared after a few days. Salicylates and alkalies were prescribed, and local applications were made, but there was no effect either on the temperature or the joint pains. The shoulders and the wrists were affected later on. As the temperature was keeping up steadily, suspicions of typhoid were raised. There were no abdominal symptoms. The patient was put on chlorine mixture and guaiacol and hydrarg. c. creta powders. His blood was sent for the Widal reaction and was reported positive. The temperature continued ranging between 101—103°F. till the 5th June, and then came down gradually to normal on the 11th June. After this he had subsultus tendinium as the temperature went down. The interest of the case lies in the fact that the patient had all the signs of acute rheumatism in the beginning, and a diagnosis of typhoid was only made tentatively and confirmed later on by the Widal test. In view of the reference above the case would, I think, be grouped under arthro-typhoid.—Yours, etc.,

J. B. VAIDYA,
MAJOR, I.M.S.

Guntur:
4th August, 1927.

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UNUSUAL LESIONS IN VARICELLA.

To the Editor, The Indian Medical Gazette.

Sir,—I have recently seen a number of cases of chicken-pox, and as certain unusual clinical points were displayed I record them for the interest of your readers.

Case 1.—A boy, aged 8½ years, had a fairly profuse rash on the trunk, limbs and head, but on the outside of the left upper arm in the region of the insertion of the deltoid muscle, the vesicles were countless and almost confluent over an elliptical area of roughly 2½ inches long.

I had inoculated this boy with T. A. B. vaccine one week previously. The confluent area was approximately the same size as the redness that usually follows T. A. B. inoculation.

I quote from Rolleston's *Acute Infectious Diseases:* "the eruption tends to be more profuse and even confluent in an area of the skin subject to irritation, e.g., by a pre-existing eruption such as eczema, the application of iodine, or a mustard plaster, scratching, sunburn, etc."

Case 2.—A boy, aged 18½ years, developed chicken-pox and the rash became very profuse on the trunk, limbs and head. The temperature was unduly raised.

Before vesicles appeared, patches of raised erythema appeared, ranging from a quarter to one inch in length, with a tiny central vesicle. These became successively vesicular and bullous; the bullæ being in some cases half an inch in diameter and containing semi-purulent serum. The lesions were in fact akin to pemphigus, and the case was recorded as pemphigoid varicella.

Rolleston says: "Another rare form of chicken-pox is that known as bullous or pemphigoid varicella, in which the vesicles are of considerable size from the first, or are of normal dimensions at first and subsequently grow to an abnormally large size."

This boy has chronic psoriasis of long standing. As the diagnosis of pemphigoid varicella is of course likely to cause a great deal of apprehension, if not of great difficulty, when differentiating from variola or varioloid, I would like to mention that in this case stress was laid on the following points.

(1) The case occurred in the middle of an epidemic of chicken-pox.

(2) The rash and the fever came out the same day. (I personally examined the boy as a contact on Saturday when he had no rash. On Sunday evening he was admitted with fever and a rash. He affirmed that he was perfectly fit on Saturday, as he must have been, since he plays in the School band and was playing a long programme on Saturday afternoon at a fete.)

(3) Bullæ, vesicles and patches of erythema were present on different parts of the body at one and the same time.

(4) Absence of headache or backache in the history of the symptoms.

(5) He had been re-vaccinated three months previously.—Yours, etc.,

P. SAVAGE,
MAJOR, I.M.S.,
Resident Medical Officer.

The Lawrence Royal Military School,
Sanawar, Simla Hills.
1st August, 1927.

A NEW GROWTH OF THE EYE.

To the Editor, The Indian Medical Gazette.

Sir,—The following case of a "new growth of the eye" may interest your readers.

Mahabir Chand, Hindu male, aged 25, was brought to me for a new growth in his left eye. He complained of defective vision as well.

Family history.—There was no history of any similar eye trouble in the family, nor any taint of syphilis.

Personal history.—No taint of syphilis or any other venereal disease. No history of injury. The growth is said to have been present from the date of birth and to be stationary.

Examination.—The new growth extends in the lower and outer angle of the eye ball (left side). Size of a split pea, triangular in shape, slightly raised from the level of the sclera; colour like the surrounding area. Firm to pressure, inner margin concave, well defined, raised, extends to some extent into the cornea. The outer margin fades imperceptibly into the sclera. On oblique illumination the growth does not seem to extend into the anterior chamber, which is normal in depth. Pupil reaction normal, fundus normal. During the past three or four years two small hairs have grown in the centre of the growth. Tension slightly raised, hypermetrophic, H M + 2.5.

The growth looks like a pterygium but differs from it in the following points:—

(1) Long duration.

(2) The base of a pterygium spreads out and merges with the conjunctiva, its apex being immovably united to the cornea. In this case the base is abruptly raised, well defined, extends to some extent over the cornea, and its apex merges with the conjunctiva.

(3) A pterygium is rich in blood vessels. This is not.

(4) A pterygium grows slowly towards the centre of the cornea. This new growth has been stationary.

(5) A pterygium is a fairly soft fold of membrane. This is firm and hard.

(6) In a pterygium hairs are absent. Recent growth of hairs in the new growth is against its being a pterygium. The whole case looks like a dermoid. Further information with regard to this case is badly wanted.—Yours, etc.,

JAGDISH RAI, M.B., B.S.

Dadri, Jind State, Punjab.
6th June, 1927.

SOME PROBLEMS IN RABIES.

To the Editor, The Indian Medical Gazette.

Sir,—The following case, which has recently come to our notice has an important bearing on certain of the points raised in Dr. Turkhud's letter and the editorial in the July number of your esteemed periodical.

A mason, named Mohan Singh, was brought into the Lahore Antirabic Centre suffering from hydrophobia, said to be the result of contact with a rabid buffalo eight months previously. At our request Lieutenant-Colonel McKenzie, I.M.S., caused special enquiries to be made at the man's village as to the circumstances of the infection, with the following results:

(1) The man developed hydrophobia eight months after having been licked by a rabid buffalo, and died two days afterwards in hospital at Lahore.

(2) He was a mason and used to work in the adjoining villages. His hands were usually cracked, due to handling lime with a brush while slaking it.

(3) When he was giving some medicine to the buffalo his cracked hands came in contact with the saliva of the animal.

(4) The animal died of rabies after an illness of three days. It had been bitten on the nose by a dog a month previously.

(5) No *bite* was observed on the man's hands at the time, nor did he mention that he had been bitten.

(6) He never mentioned to his relatives at any subsequent period that he had ever been bitten by a dog, cat or jackal at any time before or after being licked by the buffalo, nor did he say so to Dr. Ram Narayan, who took his history in hospital. The possibility of this being the case is therefore very unlikely.

This case settles two important questions raised in your article:

(1) The saliva of herbivorous animals is capable of transmitting the disease, under certain circumstances at any rate.

(2) Infection may occur after mere contact with saliva of an infected animal, i.e., "a lick" given on an abraded surface.

No history of recent abrasions is given in the present case, but it is presumed that certain of those stated to

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be present must have been so for infection to have occurred. The case thus appears to be on a par with the one reported by Cornwall, and quoted by you, of the British sergeant who was indirectly infected through the leash of a rabid dog. It has the added importance, however, of proving that the saliva of herbivora can convey the infection. It may be objected that definite proof against infection by another rabid animal is not forthcoming. To my mind this is most unlikely to have escaped the attention of the man's friends, had it occurred, and the case appears to me to be as authentic a record as will ever be obtained in cases of this kind. It would appear therefore that medical men must continue to send, and Directors of Pasteur Institutes continue to treat, cases of wounds inflicted by rabid herbivorous animals and licks sustained under conditions which give rise to the possibility of infection.

Under ordinary circumstances this case would have been reported in the annual report of this Institute, but the special attention drawn to this subject by your editorial makes it necessary that the principles underlying this particular case should have at least equal publicity.—Yours, etc.,

J. CUNNINGHAM,
LIEUT.-COL., I.M.S.,
Director,
Pasteur Institute of India.

KASAULI.
18th July, 1927.

(*Note.*—We particularly welcome Colonel Cunningham's report, because it appears to establish, once and for all, the fact that the saliva of rabid herbivorous animals may be infective. As such, it is a most important contribution to the literature.—EDITOR, *Indian Medical Gazette.*)

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—After reading the editorial in your issue for last July, dealing with the problems of rabies, I am prompted to forward to you particulars of the following incident.

On the morning of the 18th February, 1927, a rabid jackal appeared in the town of Shahganj and began to attack all and sundry. Its victims were either persons sleeping on the roadside or those going to their work. No less than eight persons (four males and four females) came to this dispensary, having been bitten by this animal, who showed tooth marks or superficial scratches inflicted by it.

One of these patients had ultimately killed the jackal by blows from his *lathi,* but in doing so, had received a deep wound on his left arm.

The wounds of all eight patients were immediately cauterised with pure carbolic acid and dressed, and the patients were advised to go to Kasauli for antirabic treatment. The man who killed the jackal, however, refused to go.

On the 1st June, 1927, I was called to see a patient in the town, and on enquiry learnt that he was one of the eight who had been bitten by the rabid jackal on the 18th February. He had not gone to Kasauli. He had developed hydrophobia, and died within three days of the first onset of symptoms. This man had received only a superficial scratch on the tip of his right index finger.

Up to the date of writing this note, the five other patients who did not go to Kasauli have remained quite well.

Points of interest in the case are:

(1) The patient who developed hydrophobia had only a mere superficial scratch on the finger, whereas the man who had killed the jackal had received a severe and deep wound; was not treated at Kasauli; and yet has not developed hydrophobia.

(2) The incubation period in the fatal case was about 3½ months. According to Taylor's *Practice of Medicine,* the incubation period of hydrophobia is usually about 2 to 9 weeks, but sometimes several months.

(3) The mortality amongst the untreated in this instance comes to 1 in 6; or about 17 per cent.

I am keeping the other persons bitten under observation; both treated and untreated.

In conclusion I would like to thank Rai Bahadur Dr. Her Prasad for allowing me to send these notes for publication.—Yours, etc.,

R. A. SARAN,
Medical Officer.

SHAHGANJ DISPENSARY,
JAUNPUR, U. P.
29th July, 1927.

(*Note.*—Dr. Saran's letter is admirable in its details of facts observed. If other correspondents would but send us similar authenticated details of cases observed, we believe that evidence of very considerable value with regard to the real incidence of rabies amongst the untreated could be compiled.—ED., *I. M. G.*)

KALA-AZAR AT HIGH ALTITUDES.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—It may be of interest to your readers to report that I have found living sandflies in a European officer's bungalow here, at the level of about 7,000 feet above sea level; above the Dow Hill School.

I have previously seen two indigenous cases of kala-azar in this neighbourhood; both occurring in persons who lived at a level of more than 3,000 feet above sea level.—Yours, etc.,

S. B. MUKERJI,
CAPTAIN, M.B.,
Civil Medical Officer.

KURSEONG,
DARJEELING HIMALAYAN RAILWAY.
28th May, 1927.

RICKETS AND INFANTILE CIRRHOSIS OF THE LIVER.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—With reference to some doubtful points raised by Dr. P. A. Narayana Aiyar of the Madras Government Ophthalmic Hospital in the March 1927 number of the *Indian Medical Gazette* on the observations made by Dr. A. S. Vaidyanada Iyer in his article on "Infantile Cirrhosis of the Liver," published in the December 1926 issue of the *Indian Medical Gazette* I would like to say a few words on the distinguishing points between rickets and infantile cirrhotic livers as observed by me.

(1) That rickets is due to the deficiency of fat soluble vitamine "A" has been definitely proved; whereas infantile cirrhosis of the liver has not, as yet, been proved to be a deficiency disease.

(2) Rickets is comparatively rare in India and the rarity is attributed to the regular and frequent massage of children with organic fatty oils, such as gingelly oil in the South, cocoanut oil in Malabar, and mustard oil in Northern India, even among the poorer classes of people. The few cases of rickets that are met with are found mainly among the poorer classes; but cases of infantile enlargement of the liver almost exclusively occur in the richer classes of the Hindus, especially in vegetarian families.

(3) The main pathological changes in rickets occur in the bones. In infantile cirrhosis of the liver the bones are not at all affected.

(4) The majority of cases of rickets occur between 6 and 12 months of age. Infantile cirrhosis of the liver occurs between one and two years of age.

(5) Delay in the eruption of the teeth is common in rickets, whereas it is not the case in infantile cirrhotic livers.

(6) The prognosis is good in rickets; on the other hand the prognosis in infantile enlargement of the liver is grave.

It is true that the signs and symptoms of advanced cases of infantile cirrhosis resemble those of rickets; but one can easily recognise a case of infantile cirrhosis

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BRITISH MEDICAL JOURNAL, *Jan 23rd. 1926*

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if one is fairly experienced in the observation of infantile ailments.—Yours, etc.,

N. GOPALAN, L.M.P.,
Sub-Assistant Surgeon.

Tiruvetipuram,
North Arcot District.
19th July, 1927.

OSTELIN.

To the Editor, The Indian Medical Gazette.

Dear Sir,—We have read with considerable interest the half-column appearing under the heading of Ostelin in the June issue of your paper. We would, however, draw your attention to an obvious printing error in the sentence stating that Ostelin contains the full Vitamin "A" content of cod-liver oil. This of course should read Vitamin "D."

With regard to the odour of certain samples to which you refer—it is unfortunately impossible in the present state of our knowledge to make an extract which shall be perfectly free from odour, and yet retain its full activity. Some of the earlier samples of Ostelin exhibited this odour in a more marked degree than present supplies, and even at the present time it is not possible to avoid variations in the odour, due partly to variations in the different batches of original oil.

However, there is no question of this odour denoting deterioration. Ostelin is not subject to fermentative changes, and keeps perfectly in the tropics, which is indeed one of its greatest advantages over ordinary cod-liver oil. The activity of our research chemists is constantly directed to improving our product, and we hope in time to overcome this problem of odour entirely. In the meantime we feel that to maintain full activity at all costs is the correct policy to pursue.

As there is a likelihood of your remarks creating misunderstanding in the minds of your numerous readers, you will perhaps be good enough to allow this letter a portion of your valuable space.—Yours, etc.,

"OSTELIN."

56, Osnaburgh Street,
London, N. W. 1.
21st July, 1927.

A NOTE ON THE GEOGRAPHICAL DISTRIBUTION OF SOME OF THE DISEASES OF INDIA.

To the Editor, The Indian Medical Gazette.

Sir,—With reference to Colonel Megaw's article on this subject in a recent issue of the *Gazette*, I should like to append the following notes.

Sandfly Fever.—I have diagnosed no cases in Assam, but when I was stationed at Cannanore, Malabar, in 1917–18 a number of cases of fever occurred amongst young officers which appeared to be typical of this disease. It was a mild, three-day fever. Biting sandflies were plentiful at the time, and I think I found a *Phlebotomus*, but cannot remember with certainty. As this was in the Madras Presidency, further inquiry there would be of interest.

Dengue.—I have spent about 20 years in tea estate districts in Assam, and although I have seen several cases, in every instance the patient had been to Calcutta, or on a river steamer trip. When I first arrived in Cachar in 1905, I immediately developed a severe attack of seven-day fever, evidently a Calcutta infection, and when the disease is epidemic in Calcutta cases occur in this way up here. I have never seen a case without the patient having been away, and although the disease might be missed amongst the coolies, the final *diagnosis* would seldom be missed in my European patients. My impression is that *Stegomyia fasciata* is not commonly found, although *scutellaris* is plentiful.

Yaws.—I found occasional cases amongst coolies in Dibrugarh, and many cases in N.-W. Cachar (Dr. A. Powell's former practice), and in *South Sylhet*. I wonder if the disease afflicts to any extent the Sylhettis. The sub-assistant surgeons, at any rate the class we get on tea estates, do not appear to recognise the disease, and put it down as syphilis.

Kala-azar.—The Luskerpore Valley, in which my present practice is situated, is in South Sylhet, bordering on Hill Tipperah and Eastern Bengal, and in these adjoining areas where kala-azar appears to be rampant. Yet the only cases I have had have been two or three on one garden, which borders on Tipperah and is rather outside the district proper, and a few cases in the babu class, which were obviously imported. The difference is probably due to absence, or scarcity, of the carrier, for, although I do not pretend to have made a systematic search, I have not found a *Phlebotomus* among the small biting flies examined. The distribution is in contradistinction to malaria, for if the general terrain were as favourable for the latter disease as it is on the tea estates, the local Bengali, lacking resistance and treatment, would in all probability be wiped out. This local distribution of kala-azar bears out how difficult it is to affirm that a disease is non-existent in a province or district.

Typhoid Fever.—Cases are found occasionally in both Europeans and Indians. During my term I have had only four cases in the former. The European is in youth so susceptible to this disease, that, if it were as prevalent as is suggested, many more cases would be expected, more especially as the young assistants are dependent for domestic service on unreliable and not too cleanly coolies.—Yours, etc.,

R. A. MURPHY,
Medical Officer.

Medical Association,
Luskerpore Valley.
17th June, 1927.

Service Notes.

Appointments and Transfers.

Major S. M. Hepworth, M.B., I.M.S., is appointed temporarily to act as Superintendent, *X*-ray Institute, Dehra Dun, with effect from the forenoon of 3rd August, 1927, until further orders.

The undermentioned officers are appointed substantively to the Medical Research Department, with effect from the 8th August, 1927:—

Major S. S. Sokhey, I.M.S.
Major G. Covell, M.D., I.M.S.

Promotions.

To be Brevet Colonel.

Lieutenant-Colonel W. D. A. Keys, C.I.E., I.M.S.

To be Brevet Lieutenant-Colonel.

Major J. Scott, D.S.O., O.B.E., I.M.S.

The promotion to present rank of Major B. Z. Shah, I.M.S., notified in Army Department Notification No. 1552, dated the 17th December, 1926, is antedated from the 5th November, 1926 to the 5th May, 1926.

Captains to be Majors.

W. J. Webster, M.C., M.B. Dated 16th August, 1927.
C. E. A. Smith. Dated 1st August, 1927.
K. S. Master, M.C., M.B. Dated 10th August, 1927.
S. R. Prall, M.B. Dated 18th August, 1927.

Lieutenants to be Captains.

Robert Linton, M.B., I.M.S. Dated 29th November, 1926.
Alastair Tait, M.B., I.M.S. Dated 22nd December, 1926.
James Forrest Shepherd, M.B., I.M.S. Dated 29th February, 1927.

Retirements.

Colonel E. L. Perry, D.S.O., K.H.S., I.M.S., retires, 24th June, 1927.

Lieutenant-Colonel L. P. Stephen, M.B., F.R.C.S.E., retires, 4th July, 1927.

Miscellaneous.

With reference to Army Department Notification No. 2649, dated the 15th August, 1919, the Governor-

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General in Council is pleased to direct the publication of the following Royal Warrant, dated the 10th June, 1927, amending the rules regarding the age for retirement of General Officers of the Indian Medical Service:—

George R. I.

Whereas we deem it expedient in the interests of the service to make the following change as to the age at which officers of Our Indian Medical Service holding administrative appointments shall be placed on the Retired List.

Our Will and Pleasure is that General Officers shall be placed on the Retired List at the age of 60 instead of as heretofore at the age of 57. It is Our Further Will and Pleasure that the provision, whereby a General Officer holding an administrative appointment may be continued in employment for not more than one year, in any special case where it appears to Our Governor-General in Council to be for the good of Our Service, shall be cancelled.

Lastly it is Our Will and Pleasure that Our Warrant dated 13th June, 1919, shall be amended accordingly.

Given at Our Court at St. James's this 10th day of June, 1927, in the seventeenth year of Our reign.

By His Majesty's Command,
BIRKENHEAD.

NOTES.

WATSON'S *MICROSCOPE RECORD.*

THE May 1927 number of the *Microscope Record*, published by Messrs. Watson & Sons, Ltd., 313, High Holborn, London, W. C. 1, is—as usual—full of interesting matter to microscopists and laboratory workers. Dr. Eric Ponder, M.D., F.R.S.E., contributes an article on micro-dissection, giving full details for beginners in this difficult field, whilst an account of Chambers' micro-dissection apparatus, which is made to fit on to the stage of the ordinary microscope, is also included. Dark-ground illumination (for low powers) is dealt with by Dr. F. J. Brislee, D.SC., F.I.C., F.R.M.S., and Mr. G. T. Harris continues his study of the Desmidiceæ. An interesting point mentioned in the editorial note is that Mr. A. A. C. Eliot Martin has announced that he has seen ciliary movement on the surface of diatoms. The problem as to how diatoms move, inasmuch as they apparently possess no locomotor organs, has always been an interesting one; whilst the same problem applies to the spirochætes, and it will be of very great interest if Mr. Eliot Martin findings are confirmed. The same author also describes a micrometrically standardised diatom test-plate, whilst Mr. H. John Gray details a method of mounting crystals for the micro-polariscope. Amongst other items, Mr. W. G. Royal-Dawson gives a method of mounting pollens for the microscope; this should be of interest to all botanists in India, and it may even prove helpful to the laboratory medical worker, who may occasionally come across pollen grains in examining fæcal emulsions for protozoal cysts, and not know what to make of them. The subject of interference figures in the use of polarised light with the microscope is dealt with by Mr. Chetwynd Palmer.

The *Microscope Record*, of which copies are available on application to Messrs. Watson & Sons, is a periodical publication which will be much appreciated by microscopists and laboratory workers generally.

THE GASTRIC RESPONSE TO MEAT AND YEAST EXTRACTS.

IT is now recognised that vitamine B is essential to the dietary, animals which have been deprived of it in the diet showing a loss of appetite and a diminished body weight. The work of Cogwill in America has suggested that "a certain amount of vitamin-containing preparation is necessary to maintain the appetite successfully over long periods of time," the deficiency in vitamine B resulting in general alimentary disturbance and loss of appetite. Other investigators have suggested that vitamine B supplies a necessary stimulus to the pancreas and other alimentary glands.

In the *American Journal of the Medical Sciences* for October 1926, Drs. L. M. Gompertz and W. Cohen record the results of a study of the possible effects of foods containing vitamine B on the gastric functions in man. In the first place a standard diet was administered, viz., one shredded wheat biscuit (100 calories of wheat) and 200 c.c. of boiled water. This served as the standard breakfast and was modified by adding either 200 c.c. of a yeast solution (prepared from Vegex, a yeast extract corresponding to the English Marmite) containing 10 gms. of Vegex; or by adding 7 gms. of Leibig's meat extract in 200 c.c. of boiled water.

It was found as a result that both the meat extract and the extract of yeast, in the quantities used, promoted gastric secretion. Yet the secretion-promoting results cannot be ascribed to vitamine B, since the results were quite as apparent in the cases where this food accessory factor was lacking. The stimulating factor cannot be either creatin or creatinin, since both are absent from the yeast extract used. The results, as reported, support the widely-held view that the extract of meat is a "promotor" of gastric secretion and also justify the addition of the yeast extract as a gastric succagogue. "In vitamine B or yeast extract we have a combined tonic, succagogue, and food product of undoubted clinical value. In certain pathological conditions where meat or its extractives are prohibited, yeast products may be substituted. Such preparations may be of especial value in hospitals where patients of certain religious beliefs refuse to take meat, and from this standpoint yeast-vitamine preparations may have dieto-therapeutic value in appropriate conditions."

In brief, the case for yeast products containing vitamine B as an addition to a vegetarian dietary in cases of illness is a strong one. Of such preparations, Marmite is one which is to-day in general use, and which was widely used during the Great War. It is an interesting preparation to prescribe in cases of intestinal disorder and *malaise*, and should be readily obtainable in India. The Sanitarium Food Co., 36, Park Street, Calcutta, are the Indian agents for the Marmite Food Extract Co., London. For vegetarian patients it is evident that Marmite may provide a substitute for such meat extracts as are usually prescribed in cases of debilitating illness.

Publishers' Notice.

SCIENTIFIC Articles and Notes of interest to the profession in India are solicited. Contributors of Original Articles will receive 25 reprints *gratis*, if asked for at the time of submitting their manuscripts.

Communications on Editorial Matters, Articles, Letters and Books for Review should be addressed to THE EDITOR, *The Indian Medical Gazette*, c/o The Calcutta School of Tropical Medicine, Central Avenue, Calcutta.

Communications for the Publishers relating to Subscriptions, Advertisements, and Reprints should be addressed to THE PUBLISHERS, Messrs. Thacker, Spink & Co., P. O. Box No. 54, Calcutta.

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Original Articles.

SEBORRHŒIC DERMATITIS OR PITYRIASIS CAPITIS: A LESION CAUSED BY THE *MALASSEZIA OVALE*.

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(An Enquiry carried out under the Indian Research Fund Association.)

HITHERTO our knowledge of the lesions that are caused by the *Malassezia ovalis* has been in a chaotic state, because the organism had not been cultivated before, and consequently its life-history and relationship to the other parasitic fungi was not known. Many authors employ the term 'seborrhœa' in its original sense, which means an excessive flow of sebum. This excessive production of sebum was considered by them to be a functional disturbance of the sebaceous glands rather than a disease, and the name 'seborrhœa' was applied to those lesions where this sebaceous flux was considered to be the underlying cause. At the end of the 18th century the British dermatologist Robert Willans first used the term 'pityriasis' for those cutaneous lesions that were characterised by the appearance of delicate pellucid scales like small flakes of bran, and were shed from the skin without obvious signs of inflammation. The word pityriasis is derived from the Greek πιτυρον (pityron) meaning bran, and Willans considered the scales to be derived from the epidermis. Since his time, the term pityriasis has been extended to other scaly conditions of the skin like pityriasis rosea, pityriasis rubra pilaris, etc., diseases that are totally different in origin to dandruff. Later Hebra and his pupils added to the existing confusion by teaching that the scales were not derived from the epidermis, but were dried flakes of inspissated sebaceous matter coming from the sebaceous glands. They taught that when there is an excessive flow (seborrhœa), the scales formed may be oily (seborrhœa oleosa) or dry (seborrhœa sicca). The next dispute arose as to the source of origin of the oiliness of the skin, as there are three sites from which the fat may be derived, viz., the sebaceous glands, the sweat glands, or the epidermis. Unna, basing his opinion on the fact that the skin of the palms contains no sebaceous glands, but only sweat glands, and yet in spite of this fact the palms are greasy in these subjects, thought that the fat must be derived from the sweat glands. He considered that these lesions were caused by an anomaly of the sweat glands, and called the disease hyperidrosis oleosa. The French school, influenced largely by the researches of Sabouraud and others, considered the seborrhœa in its mildest form to be a local inflammatory lesion of microbic origin. Sabouraud described in these scales two types of organisms (*i*) a large yeast-like organism that buds, the spore of Malassez or the flask bacillus of Unna. (*ii*) the grey coccus or morococcus; and when acne occurred as a complication, the acne bacillus was also found in the lesions. Sabouraud therefore divided the seborrhœas clinically under the following heads:—

(*a*) Dandruff or seborrhœa capitis, which was followed in later life by seborrhœic alopecia.

(*b*) Seborrhœic dermatitis, seborrhœa corporis, flannel rash, or seborrhœic eczema.

(*c*) Acne vulgaris, comedones or black heads.

(*d*) Papular seborrhœas in connection with acne rosacea.

(*e*) Seborrhœic warts in old age.

Later on in this paper we will show that all these lesions are caused by the *Malassezia ovale*, and that the flask bacillus of Unna and the morococcus are the different methods of reproduction of this parasitic fungus. This fungus has for the first time been successfully cultivated in our laboratory by one of us (G. P.), and we have found that it requires a fatty medium that must be rather dry; hence its relationship to the seborrhœic state. We therefore consider that the name pityriasis, which was first used by Willans, is the most appropriate to use; and under this head we include three distinct lesions.

(*i*) Pityriasis capitis, which starts on the scalp and spreads on to the body.

(*ii*) Pityriasis versicolor, which starts on the chest and extends upwards to the neck and face.

(*iii*) Pityriasis flava—Castellani's tinea flava—which starts on the face and neck and extends down to the chest.

These three clinical conditions are due to three distinct species of Malassezia, and the parasites can readily be demonstrated in these lesions. The other scaly conditions such as pityriasis rosea and pityriasis rubra pilaris are diseases due to internal causes, that are reflected on to the skin surface, and no parasites are found in scrapings made from the surface of these lesions. They should therefore be classified in quite a different category from the true pityriasis due to the Malassezia. The importance of pityriasis capitis is that the scalp forms the source from which these fungi invade other parts of the body, and owing to the trivial lesion it causes in the scalp until baldness appears in middle life, the seat of the disease is often overlooked and left untreated by the physician. Furthermore, from these scales in the head, one can practically always grow the staphylococcus aureus or albus, so that the scalp lesion again forms the great source of supply for these cocci to other parts of the body, causing pimples, boils, etc. When the Malassezia grows on very fine skin like the face, flexure of joints, etc., of children, the desquamation it produces causes the basal cell layer to become exposed and allows the

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invasion of the corium by streptococci, producing the seborrhœic eczema and eczema rubra of children. Thus it will be seen that pityriasis capitis is the next most important parasitic disease of the skin after ringworm.

Synonyms.—General terms, seborrhœic dermatitis, seborrhagia, steatidrosis, seborrhœa (Hebra), hyperidrosis oleasa (Unna), flux sebacea (Rayer).

Localised types. Scalp.—Dandruff, pityriasis capitis, seborrhœic dermatitis of the scalp, seborrhœa sicca, seborrhœa oleosa, seborrhœic alopeca.

Glabrous skin.—Seborrhœic dermatitis, pityriasis circinata, pityriasis steatoides, flannel rash, seborrhœa corporis, lichen circinata.

Acne.—Comedo, blackhead, grouped comedo, acne vulgaris, acne disseminata, acne necrotica.

Lips.—Exfoliative cheilitis.

Eczematous.—(Streptococcal) seborrhœic eczema, eczema rubra, seborrheide eczematisante.

Definition.—The disease is due to infection of the scalp by the *Malassezia ovale* which invades the surface layers of the epidermis and produces a furfuraceous desquamation. The invasion of the epidermis is predisposed to by an excessive oiliness of the skin due to an over-activity of the sebaceous glands. The invasion may extend to the face, blocking the sebaceous glands (comedo and acne), or on to the body as a flannel rash. On the scalp in adult life it invades the hair follicles and pilo-sebaceous glands, giving rise to baldness (alopecia).

Aetiology.—In order to understand the various factors that influence the implantation of the *Malassezia ovalis,* it is first necessary to study the histology of the embryonic skin. Primitively the embryonic skin consists of two layers, (1) a basal layer of columnar cells, (2) Rauber's layer, which consists of swollen cells that stain badly and do not keratinise, but form some fatty substance which acts as a waterproof coating preventing maceration of the skin by the liquor amnii. About the tips of the fingers and toes, these cells become very swollen, are dome-shaped and polygonal, and are called the bladder cells of Zander. It is not until after birth that the superficial layer of the skin undergoes keratinisation. It is in this early stage of life, i.e., during the first three years, the Malassezia first infects the scalp and occasionally extends to the face and extremities. Besides the skin, it is also necessary to study the histology and physiology of the sebaceous glands. Primitively as is seen in fishes and amphibians like frogs, where there are no dermal appendages present, the sebaceous glands are simple saccular glands situated below the epidermis and scattered over the body surface. They are also seen at the orifices of the various openings of the body on to the surface, such as the mouth, cloaca, etc. With the appearance of the dermal appendages, i.e., the hairs, many of these glands in turn become an appendage of the hair follicle. We have therefore two distinct types of sebaceous glands.

(A) Pilo-sebaceous glands that occur as an appendage of the hair follicles and are found wherever hair is present on the body. These glands can be further subdivided into two groups:

(Ai) Pilo-sebaceous glands that still retain their morphological relationship to the hair, for example on the scalp, beard, etc. These sebaceous glands are simple or bi-lobed in structure, and those that are connected with well developed hairs are comparatively smaller in size, than those connected with the lanugo hairs, which are large and racemose in type. There seems to be a distinct relationship between the size of the hair follicle and its accompanying sebaceous glands; the large hairs have small glands and the lanugo hairs large glands. These areas of skin are usually the sites of pityriasis.

(Aii) Pilo-sebaceous glands that have now lost this relationship to the hairs, owing to the denudation of the hair from the general body surface. These glands are large, multi-lobed, and racemose; they are most numerous on the forehead, the sides of the nose, the back of the neck, the mid-thoracic regions, i.e., external and interscapular, and finally over the sacrum. These areas are often the sites of acne.

(B) Sebaceous glands that were never morphologically associated with the hairs, but inherit some other function assigned to them other than oiling the hair shafts. These glands are large and racemose in shape. They can likewise be subdivided into two groups:

(Bi) Sebaceous glands that have an association with the sexual glands. The best instance of this association is the mammary gland, but there are numerous glands in the axilla, scrotum, prepuce and labia, which not only lubricate these regions but produce volatile fatty oils, which impart a distinct odour to the individual or species; this odour is most marked during the rutting season. These glands may be infected by various organisms that give rise to inflammation and abscess formation. Later on in life, retention cysts may form in them as the result of previous irritation.

(Bii) Sebaceous glands that are concerned with the lubrication of the various orifices of the body, for example, the ceruminous gland of the ear, the Meibomian glands of the eyelids, the glands on the lips, round the anal margin, etc. These glands are often the seat of staphylococcal inflammation, the organisms being derived from the scalp when affected with pityriasis capitis, and they cause abscesses of the external auditory meatus, styes, or retention cysts, etc. There are no sebaceous glands in the palms and soles, the fat from these areas is derived from the sweat glands which are very numerous. Sections of these sweat glands stained by Sudan III show tiny fat droplets at the extreme end of the coiled gland.

Sebum is an oily secretion, becoming cheesy in consistence on exposure to the air. In chemical composition it is very similar to lanoline that is extracted from the wool of the sheep. Besides the fatty acids, such as stearic and palmitic,

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PLATE I.

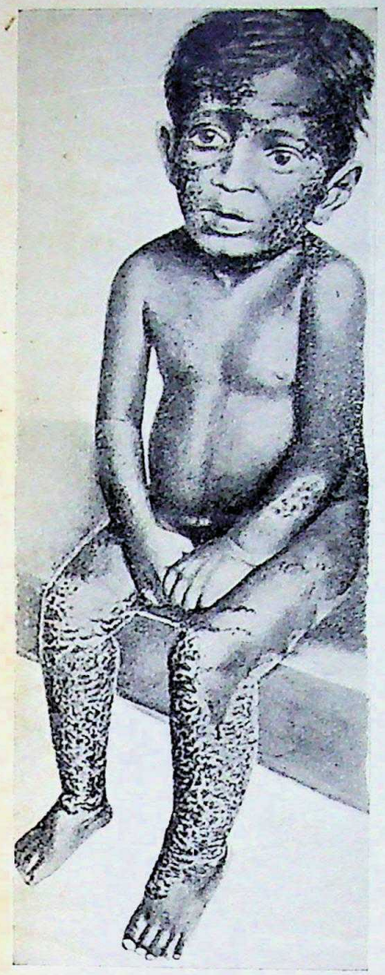

Fig. 1.—Extensive seborrhœic dermatitis with secondary streptococcal infection (Kayur).

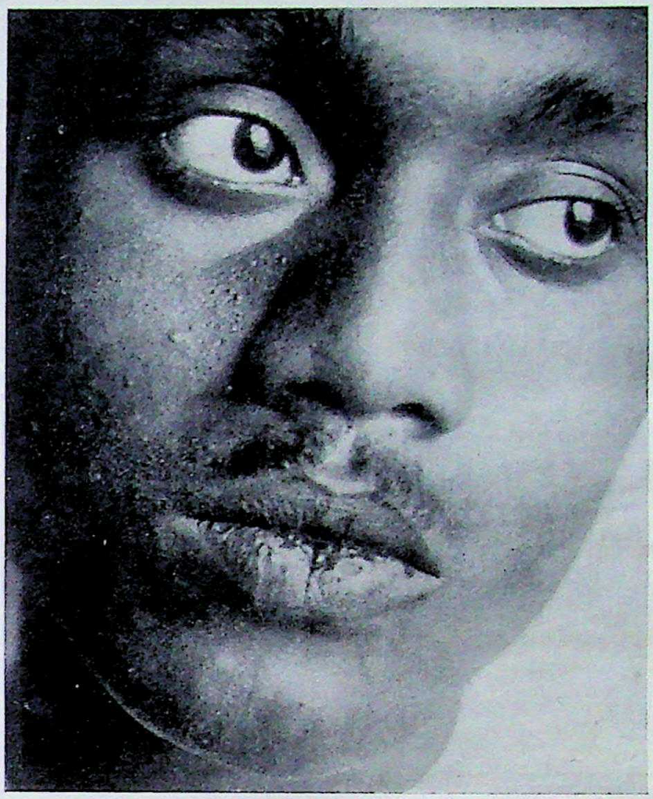

Fig. 2.—The skin of the face is in a condition of kerosis, with slight acne. There is an exfoliative chilitis on the lips and small slightly depigmented patches of seborrhœa on the chin.

Fig. 3.—Extensive seborrhœic dermatitis with comedones on on the back.

Fig. 4.—Dandruff of the scalp and extension behind the ears.

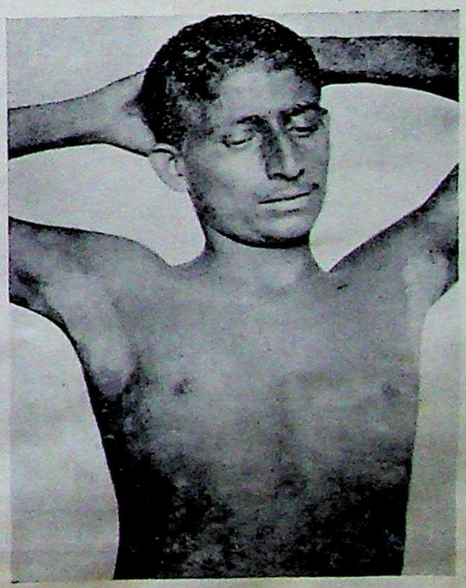

Fig. 5.—Seborrhœic dermatitis of the axillæ with greasy scales and slight depigmentation. This condition is frequently associated with boils.

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PLATE II.

Fig. 6.—Extensive seborrhœa of the scalp and forehead with secondary impetigo.

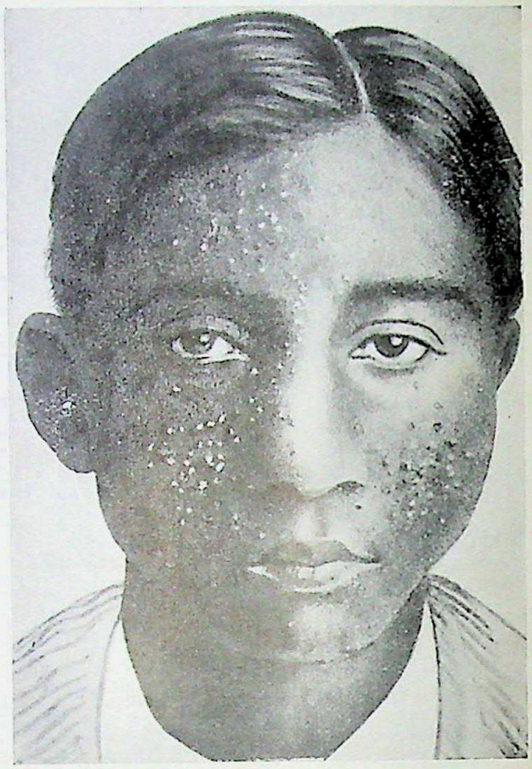

Fig. 7.—Acne vulgaris of moderate severity.

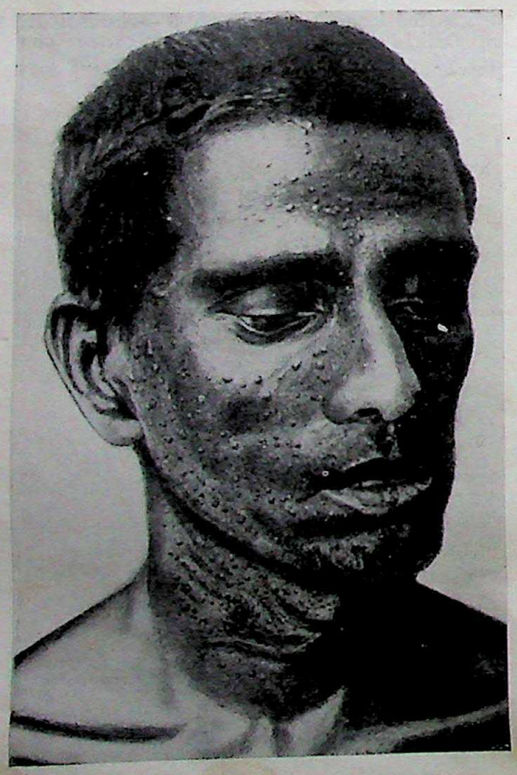

Fig. 8.—Acne frontalis and agminata.

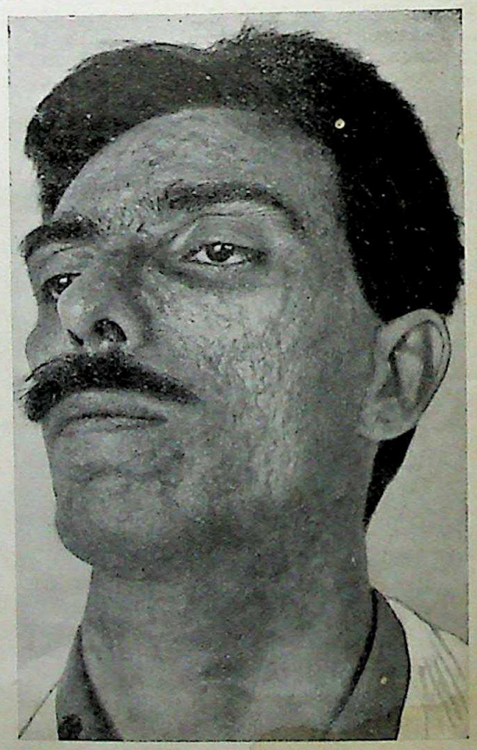

Fig. 9.—Acne with deep scars, some keloid and others morphœa-like.

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there are also volatile acids that impart a distinct odour to the sebum. Sebum is not a true secretion like the milk from the mammary glands, but is produced by the superficial layer of the sebaceous gland not being converted into horny cells, so that it undergoes a peculiar fat vacuolisation which converts the whole cell into sebum. On the surface of the epidermis when infection by the Malassezia takes place, an exactly similar change is seen whereby the greasy scales of dandruff are produced by this failure in keratinisation. When the same organism invades the sebaceous glands, the surface layers are rapidly transformed into sebum, so that it appears at the orifice of the follicle as a tiny droplet of oil. The sebaceous glands are not supplied with nerve fibres, so they are not under nerve control like the sweat glands. The regulation of the flow of sebum is dependent therefore on the following factors:—

Heredity no doubt plays a very important part in determining the number of these glands, and their relationship to the hair follicles. In certain families there is a tendency for many of the members to have a greasy skin, with a proneness to baldness or acne. We believe that whenever this hereditary factor is present, there is nearly always a partial association with some alteration in the function of the different endocrine organs.

Race.—The middle class Bengali is particularly prone to baldness, due to infection of the scalp by the *Malassezia ovalis*. In the North West Frontier of India, amongst the Pathans who keep their hair long, baldness is rare and is generally regarded as a great disfigurement and a sign of misfortune. In textbooks, the theory advanced is that baldness has some relationship to wearing rigid head-dress, such as a bowler hat. This finds no confirmation in the above fact as the Bengali never wears any head-dress, whilst the Pathan wears a hard *kulor* surrounded by a large turban.

Sex.—Baldness is comparatively rare in women, but whether this is due to the difference in the sex endocrine functions, or to the protection of the scalp from infection by wearing long hair is at present unknown. Long hair should prevent infection of the scalp by the Malassezia, and moisture would hinder the growth of this parasite. Whether the present fashion of bobbing the hair will increase the occurrence of alopecia remains to be seen, as time will soon show which of these two factors is the more important, i.e., wearing the hair long or the influence of the gonads.

Age.—With the fœtus *in utero*, when the developmental processes are at their height, the sebaceous glands are particularly active, and as we have seen the surface layer instead of keratinising forms a desquamating layer of fatty cells, the vernix caseosa; this protects the fœtus from the macerating effects of the liquor amnii. The protection is very similar to that seen in certain fishes that have no scales on the body, and in whom the skin is directly in contact with water. A few days after birth the vernix caseosa is shed, and the superficial layer begins to keratinise gradually. It is at this stage that the scalp is liable to be invaded by the Malassezia. The fungus usually attacks the scalp and the pilo-sebaceous glands about the face, giving rise to the condition known as miliary sebaceous acne. More rarely it attacks the sebaceous glands in front of the chest or the back, giving rise to grouped comedones. These lesions may be seen in infants up to two or three years of age. From this age until puberty, there appears to be very little chance of *Malassezia ovalis* infections, as the functions of these glands and the gonads are more or less in abeyance. At puberty, the sexual glands again become active, and with them the activity of the sebaceous glands increases, giving rise to the peculiar condition of the skin that predisposes to pityriasis and acne. Darier has described this condition under the term kerosis, when the complexion is of a muddy colour, and the skin is coarse, greasy and thickened; the sebaceous gland mouths are large and patent, whilst many of them about the nose are blocked with blackheads (comedo). Kerosis usually disappears during early adult life at 25 years or so, but may persist throughout the whole of the period of sexual activity. Women are not so prone to pityriasis capitis, but among those who suffer from acne there is often a relationship with the menstrual cycle and activity of the gonads. In men between 30 and 40 years of age, i.e., at the height of sexual activity, the extension of the infection takes place from the scalp to the body, the baldness also appears about this period. Still later on in life, we see the appearance of sebaceous cysts, and finally the occurrence of seborrhœic warts.

There appears to be little doubt that the soil which is the most suitable for the *Malassezia ovalis* is one that is related to an excessive function of the sexual glands, particularly that of the male gonad. There are various other factors that help the growth of this fungus, i.e.

Customs and habits.—In Bengal the universal custom is to anoint the body and scalp with oil before bathing; this increases the greasiness of the skin and is probably one of the reasons why pityriasis is so common amongst the upper class Bengalis. In England, during the winter months amongst the poorer classes, lack of cleanliness, wearing the same garments day and night for a considerable period, and bathing infrequently once a week or so, are probably the chief causes of the Malassezia invading the body surface, i.e., the so-called flannel rash that is seen at this time of the year.

Diet.—There is no doubt that the ingestion of an excessive amount of sugars, fats and starchy foods increases the greasiness of the skin. Alcohol in excess acts in a similar way.

Temperature and humidity.—In Calcutta the extension of pityriasis is best seen just before and during the early monsoon period when the temperature is high, 90° to 101°F., and the humidity is not excessive.

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Relative acidosis.—Baber and Semon (1918) B. M. J., p. 2245, considered that treatment by alkalies given internally helps in preventing the spread of the infection of this parasite. We have not been able to verify this finding.

These are the main factors that increase greasiness of the skin, with an absence of moisture, and make the two conditions that are essential for the growth of the Malassezia. There is little doubt that sebum is a bad medium for the growth of most organisms. The only bacteria that will grow well on these scales are the various kinds of staphylococci, i.e., albus, aureus. These cocci hinder the growth of the Malassezia which grows ærobically. Under anærobic conditions, such as occur in the sebaceous glands in the comedo, the acne bacillus will then appear as a secondary invader. Some observers consider that with the diminished flow of sebum from the sebaceous glands that occurs before puberty, the parasiticidal effect of the sebum is lost, and the various types of ringworm can then grow on the scalp of these young children. After puberty, when these glands are active and the sebum exerts its parasiticidal effect, ringworm of the scalp becomes a rarity.

Clinical types.—Infection of the skin by the *Malassezia ovale* may occur during three periods of life:—

(*a*) In infancy. This type of infection is most frequently seen during the first and second year of life, and commences on the scalp as a greasy heaping up of scales, which are often dark coloured owing to being covered with dirt. From the scalp the infection spreads on to the face, and its typical location is over the flush area of the cheeks. The mildest lesions seen on the cheeks consist of slightly scaly desquamating areas with erythema. In the more severe cases there is generally secondary infection by streptococci, or there may be some inherited predisposition that allows the fungus to exert a marked reaction on the skin; the condition is then spoken of as eczema rubra (see Plate IX, fig. 1). The lesions on the head and face frequently become infected by a secondary impetigo and the disease then spreads rapidly over the scalp, face behind the ears, neck, and even on the body (see Plate I, fig. 3). In some children the parasitic infection may involve the forehead, producing tiny little vesicles caused by a blockage of the sebaceous glands in this area. From the scalp and face it may extend to the flexures of the arms, the popliteal space, and the front of the legs; a condition which is known locally as *kayur* in Bengal (see Plate I, fig. 1). More commonly the seborrhœa remains limited to the scalp area and gets infected with impetigo (see Plate II, fig. 6). Infants under three months or so, when they are not able to scratch themselves, relieve the irritation by rolling the back of the head and the sides of the face on the pillow and so the disease is spread on the face, etc. In older children, the impetigo is spread to other parts of the body by means of the fingers. As a rule these infants manifest little evidence of distress, such as fever, etc., for in spite of the eczema they eat well, grow and thrive. Occasionally the fungus may invade the fine skin behind the ears setting up an eczema due to secondary streptococcal infection. Very rarely does the Malassezia attack the sebaceous glands at this early age, but occasionally in infants we get grouped comedones or blackheads which become pustular (see Plate I, fig. 3). MacKenna thinks that these grouped comedones are largely due to the liberal application of oils like camphorated oil by the mother, the oil obstructs the sebaceous mouths, and these become infected by the fungus and staphylococci. One therefore sees that seborrhœa in the infant commences very early in life on the scalp, when the vernix caseosa is being shed during the first few days of life and the skin is imperfectly keratinised. If it attacks the body of these little infants, it chooses the finer skin on the forehead, cheeks, behind the ears and flexures and outer sides of the lower extremities. We can say therefore that in infants this parasitic infection involves the finest skin, and rarely attacks the sebaceous glands. From infancy until puberty there is a lull in the development of the disease, as the functions of the sebaceous glands are not active until the gonads begin to develop at puberty.

(*b*) From puberty onwards until the age of 25 or so, the Malassezia, although growing on the scalp, produces little or no symptoms or signs other than slight dandruff. This period is the time in certain individuals for the extension of the disease to take place from the scalp and invade those pilo-sebaceous glands that are not connected with the hairs. Between these ages one sees the various types of acneform lesions. In these persons, Darier has described a condition of the skin on the face which he has named kerosis (see Plate I, fig. 2), and which we have already referred to under the ætiology of the disease. The glands that are attacked are usually those situated about the naso-labial folds and those between the scapulæ and the front of the chest. More rarely does it attack the sebaceous glands on the forehead, a condition known as acne frontalis (see Plate II, fig. 8). The lesions of the sebaceous glands vary a good deal in their severity in different patients. In the mildest cases the skin becomes coarse and blackheads are formed, and from time to time these are infected by staphylococci giving rise to superficial inflammation with pustulation (pustules) or without pustulation (pimples). If the staphylococcal infection extends deep into the corium it gives rise to deep abscesses, the skin over them is bluish in colour and the abscesses take some time to suppurate and come to a head. Very rarely the suppuration may end into a localised necrosis somewhat similar to the formation of a carbuncle (acne necrotica). Such lesions are only seen in persons who are debilitated by constitutional diseases like tuberculosis, etc. The scars left by the rupture

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PLATE III.

Fig. 10.—Deep scars and the formation of retention cysts after acne.

Fig. 11.—Lichenified plaque due to seborrhœa.

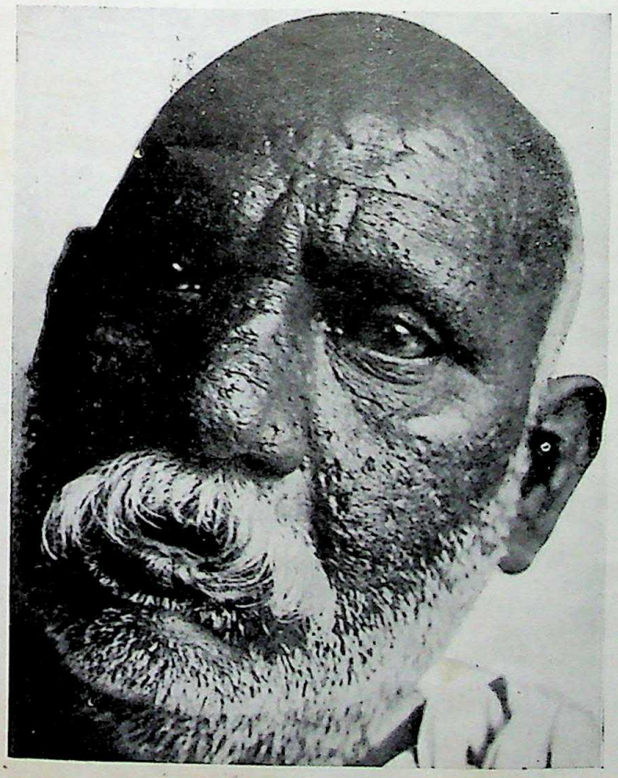

Fig. 12.—Hyper-pigmentation of the face and induration of the orium due to acne. Acne rosacea commencing on nose and side of cheeks.

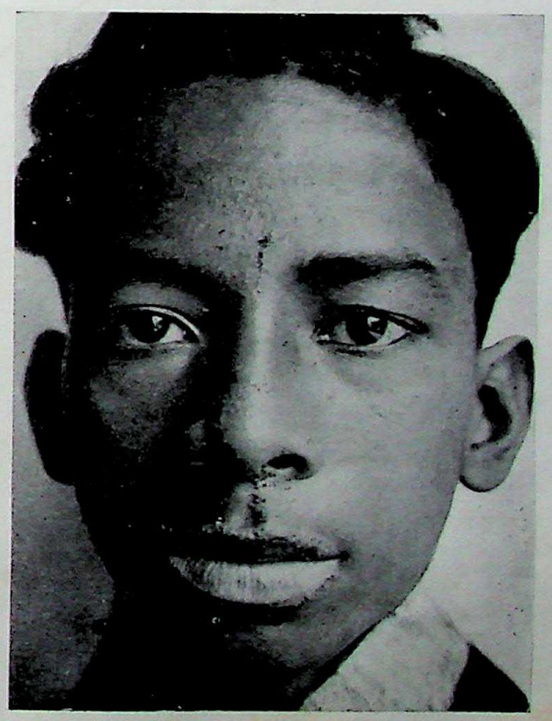

Fig. 13.—Slight acne of the forehead and labiro-nasal fold—marked chilitis, with Fordyce's disease.

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PLATE IV.

Fig. 14.—Early seborrhœic alopecia commencing on the forehead.

Fig. 15.—Late seborrhœa alopecia, almost completely bald on the vertex.

Fig. 16.—Seborrhœic warts, pigmented near the malar bone.

Fig. 17.—Seborrhœic eczema, seborrhœic dermatitis with secondary streptococcal infection.

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and absorption of these pustules also vary considerably in different individuals. In lesions that are superficial, the scars left are very small and difficult to see after the inflammation has subsided completely. In deep lesions, the scars often leave little pit-like areas scattered over the cheeks and sides of the neck. Sometimes these scars undergo keloid formation giving rise to ugly raised keloids (see Plate II, fig. 9). More rarely the scar that is formed is deeply situated and gives rise to superficial atrophy of the skin overlying it, so that these atrophic scars are white and appear like the morphœa spots of white spot disease. In the two last named conditions of scar formation, the individual shows a lowered basal metabolic rate suggesting that the degree of scar formation is in some way associated with hypofunction of the thyroid. So it will be seen that all the types of acne that have been described under different names are merely variations in the attack on those sebaceous glands that are not connected with hairs, but have been invaded by the same parasitic fungus that causes pityriasis of the scalp (see Plate I, fig. 4).

During this period of life, we see the infection still lurking in the scalp, usually as a dry seborrhœa. The dandruff scales are small, dry and greasy, and they are found to be adhering to the surface of the skin of the scalp. The skin of the scalp is not red or inflamed, and appears normal, but the hair itself is dry and has lost its lustre. From time to time there are exacerbations of the disease; in India this extension of the disease is particularly seen during the monsoon months when the scalp becomes moist and greasy (seborrhœa oleosa). The skin becomes very irritable, and scattered over the scalp are small erythematous areas with excoriations due to scratching. Extension often takes place from the scalp on to the forehead where the skin becomes red and irritable, the corona seborrhœica. The sebaceous glands then get involved on the forehead, and many of them become infected with staphylococci giving rise at first to small vesicles, these can be seen as well as felt on the forehead, and are soon followed if subjected to the friction of the hat by a crop of superficial or deep boils. More rarely does an extension take place on to the face, where it particularly attacks the skin about the eyebrows and eyelashes (see Plate IX, fig. 2). The sebaceous glands that are not pilo-sebaceous glands are more rarely involved by the Malassezia; thus we see secondary staphylococcal infection of the Meibomian glands causing styes. Infection of the inner side of the concha and its extension into the outer ear may cause abscesses of the ceruminous glands in the external auditory meatus. Occasionally the red margin of the lip is also involved, producing a lesion which is known as exfoliative cheilitis (see Plate X, fig. 2). We believe that the blockage of the glands of the lip, when the glands are seen as small rounded vesicles, is due to the same infection; the condition has been described under the name of Fordyce's disease. After 20 to 25 years of age there is generally another lull in the extension of this infection.

(*c*) From 30 to 45 years of age, the *Malassezia ovalis*, which was restricted in its attack to the surface of the skin of the scalp, now involves the true pilo-sebaceous glands, and after a few years of invasion destroys these glands as well as the accompanying hair follicles, producing the lesion known as seborrhœic alopecia or baldness. The area of baldness may first commence on the crown of the head and advance forwards, or it may start at the sides of the forehead and work back towards the crown of the head (see Plate IV, fig. 14). When the baldness is complete (see Plate IV, fig. 15), the whole of the forehead and vertex of the scalp is denuded of hair, leaving only a little hair on the sides and back of the head.

As the baldness is developing, at first the actual number of hairs is not diminished, but they become finer in texture and as the hair follicles are gradually destroyed, the space between the individual hairs becomes greater and greater until all the hair follicles are destroyed, and the skin of the scalp is seen thin, shiny and absolutely bald, the disease has at this stage burnt itself out on the scalp. During and after middle age, extensions on the body more commonly take place than at adolescence. The face is very frequently involved, first the forehead, as a corona seborrhœica, and more rarely in some Indians the whole of the face may be involved, so that the skin becomes dry and harsh, thickened and indurated (seborrhœic eczema of the face.) At the same time, as the result of deep irritation of the corium, the melanoblasts and basal layers are stimulated and the face becomes very much darker in colour (see Plate X, fig. 1). Occasionally the nape of the neck becomes involved, and with the irritation and friction of the coat or collar, the skin becomes thickened, indurated; with the movements of the neck deep furrows are produced where the normal lines of the skin were; a condition known as lichenification (see Plate III, fig. 11). More rarely pustules form and the scars becomes keloid; a condition known as dermatitis papillaris capilliti. In elderly people, the fungus may also attack the skin at the flexures of the elbows and knees, giving rise to induration and lichenification of the skin in these areas. Extension may proceed and involve the finer skin of the limbs; a condition resembling an acute exfoliative dermatitis.

In Indians, one rarely sees the disease extending on to the body as circinate lesions with a slightly inflamed base and covered by greasy scales, as is observed in England when the lesion is described as a flannel rash (see Plate X, fig. 2). During this period of life it will be seen that the Malassezia mainly attacks the pilo-sebaceous glands of the scalp and hair follicles producing baldness, but extensions may occur on the body, producing the lesions described as

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seborrhœic eczema of the face and limbs. At this age, the acneform lesions that occurred during adolescence have completely disappeared, but the skin of the face is left indurated and pitted by the numerous scars of the previous acne (see Plate III, fig. 10). In acne rossacea, there are two different factors at work in producing the disease, viz. (1) there is a reflex erythema present on the nose and side of the face that is produced by some irritation in the upper part of the alimentary canal, the continued erythema causing the skin of the face in this area to become red, and thickened; and (2) the sebaceous glands tend to hypertrophy and increase in size. These enlarged glands may then be invaded by the Malassezia, producing the papular lesions of acne rosacea. More rarely the erythema so increases the blood supply to the skin that it causes a great hypertrophy of the skin as well as of the sebaceous glands, producing the lesion known as rhinophyma. Sometimes as the result of irritation of the sebaceous gland mouths, the sebum cannot find any outlet; so that as age advances the glands gradually become enlarged as the result of the sebaceous accumulation, and retention cysts are seen (sebaceous cysts or wens). The common positions where these sebaceous cysts occur are on the scalp, along the sides and back of the head, ears, etc. More rarely in adult life, the moist thin skin of the axilla and scrotum is sometimes attacked (see Plate III, fig. 12). The skin is then covered by a thick layer of moist greasy scales with retention of the secretion of the sebaceous glands, so that staphylococcal infection takes place, and deep or superficial boils form in the axilla; a condition known as hidrosadenitis axillaris. At other times the glands are blocked, producing a condition of the skin very like Fordyce's disease of the lips, a condition described under the name of the Fox-Fordyce syndrome. On the scrotum it causes thickening and induration of the skin with intense irritation, an eczematous condition that has to be diagnosed from *tinea cruris* and other allied infections in this region. As the result of this infection of the scrotal skin, occasionally a large number of the sebaceous glands in this area are blocked, which later on develop into sebaceous cysts.

Complications.—As seborrhœic dermatitis causes desquamation of the surface skin, and prevents its keratinisation, the basal layer is very apt to be exposed and invaded by secondary organisms. The commonest secondary invasion that occurs is due to the streptococcal group of organisms. These may produce impetigo, particularly impetigo of the scalp or face, which we have described previously. They may also produce eczema, a clinical entity that has for its signs and symptoms, induration, intense irritation and some type of exudation. Such eczematous lesions we have described in early life as the eczema rubra of infants, and of the body; in later life, the eczematous conditions are seen on the face, on the body, particularly behind the neck, and on the flexures of the limbs.

(2) Staphylococcal infections. The commonest types of staphylococci seen are the *albus*, which produces superficial inflammation with or without suppuration, the *aureus* which produces superficial or deep folliculitis, and the *mollis* which generally produces the large boils that infect both the sebaceous and sweat glands.

(3) The acne bacillus also invades the sebaceous glands, and when they are obstructed a partial anærobiasis is present which is favourable for its growth. We do not believe that the acne bacillus is the causative agent of acne, but that it is merely living saprophytically when the conditions are suitable for its growth. In sections of the comedo the bacilli are usually found in the centre of the sebaceous plug and at some distance from the cells lining the distended glands.

Morbid histology.—In commencing this section we first desire to express our gratitude to Major J. C. De, I.M.S., Police Surgeon, Calcutta, for the help he has given us in every way, which has enabled us to get the necessary material for the research; and to Dr. Danapati Panja, M.B.; for the collection of the specimens and the care and skill he has shown in cutting sections of this material. The sections he has cut have given us a very clear insight into the manifold clinical lesions which this Malassezia causes when it attacks the skin, hair follicles, and those sebaceous glands not connected with the hair. We have already seen that there are two essential factors that are necessary for the growth of the *Malassezia ovalis*, viz., (*i*) oiliness of the skin, (*ii*) dryness. The parasite usually attacks the scalp first and then extends on to other parts of the body. The morbid histology of this infection is best given under the following headings, and will give a clear picture of how the disease starts and where it spreads on the skin.

The formation of the scale (dandruff.)—Plate VI, fig. 22, shows clearly how these dry greasy scales are formed, the Malassezia grows in the superficial layers of the epidermis; and is usually seen as a yeast-like budding form (the flask-shaped bacillus of Unna) or as a large coccus (morococcus of Sabouraud). During multiplication it causes an alteration in these superficial cells, preventing them becoming flat and keratinised, so that they are seen as swollen unkeratinised cells. The normal appearance of the superficial horny cells is seen on the left hand side of the microphotograph. The budding forms of the Malassezia are seen amongst the swollen cells. The affected area, which is superficial is cast off as tiny delicate pellucid scales (dandruff). When the disease is rapidly spreading, many scales are shed and the Malassezia is then seen as large rounded coccal forms, and more rarely as a mycelium.

The extension to the pilo-sebaceous glands of the hair follicles followed by atrophy (alopecia)—Plate VII, fig. 23, shows this extension from

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PLATE V.

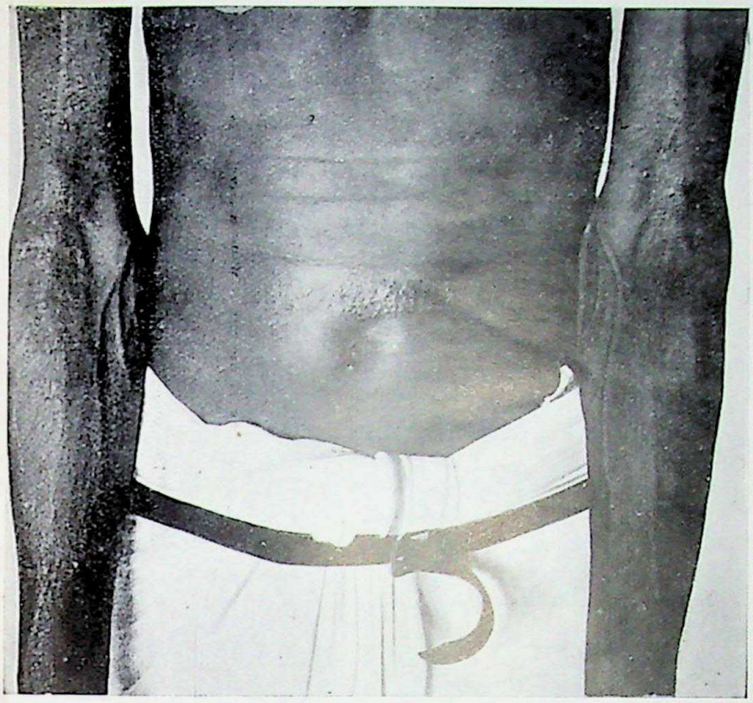

Fig. 19.—Seborrhœic eczema of the flexures of the arms, and above the umbilicus due to the junction of the dhotie.

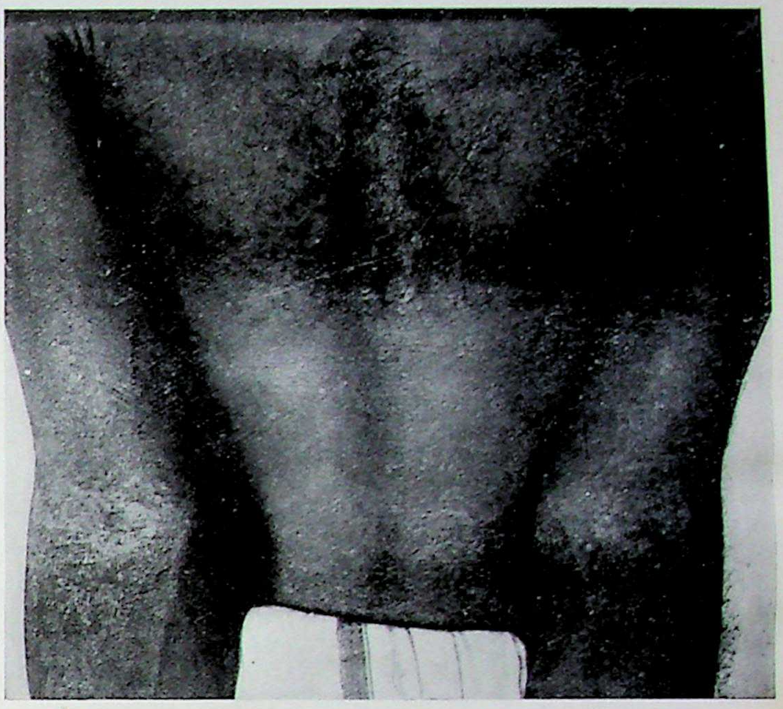

Fig. 20.—A nearer view of the seborrhœic eczema showing lichenification and the excoriation of the skin due to scratching.

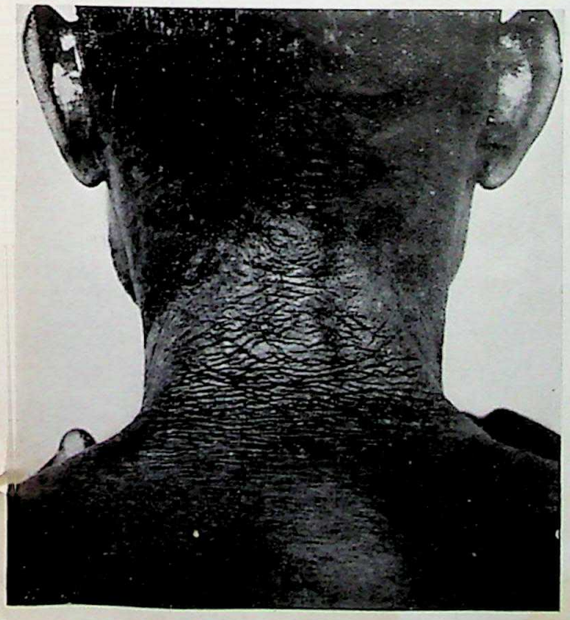

Fig. 18.—Seborrhœic eczema at the back of the neck with lichenification.

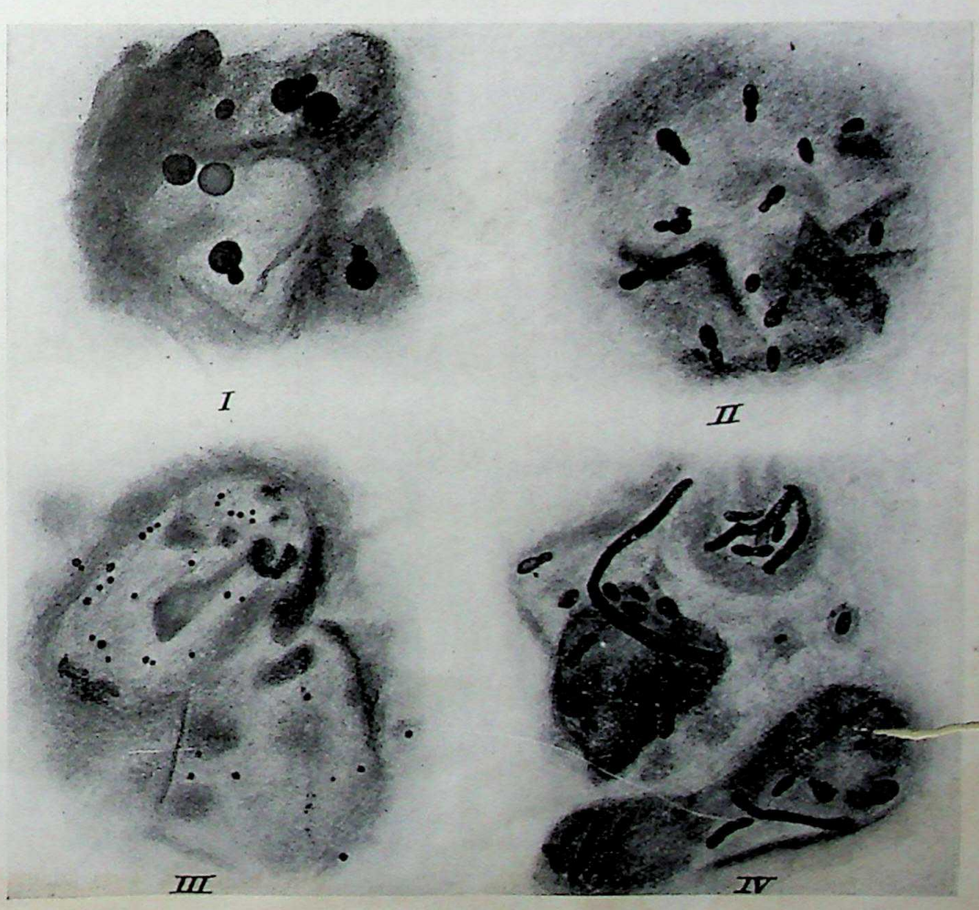

Fig. 21.—Pityrosporon ovale.

(*i*) The large round forms lightly staining in quiescent lesions.
(*ii*) The bottle or flask forms seen when the disease is active.
(*iii*) Small coccal forms seen when the lesions are acute and spreading.
(*iv*) Mycelal forms seen more commonly in the scalp when the dandruff scales are numerous.

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PLATE VI.

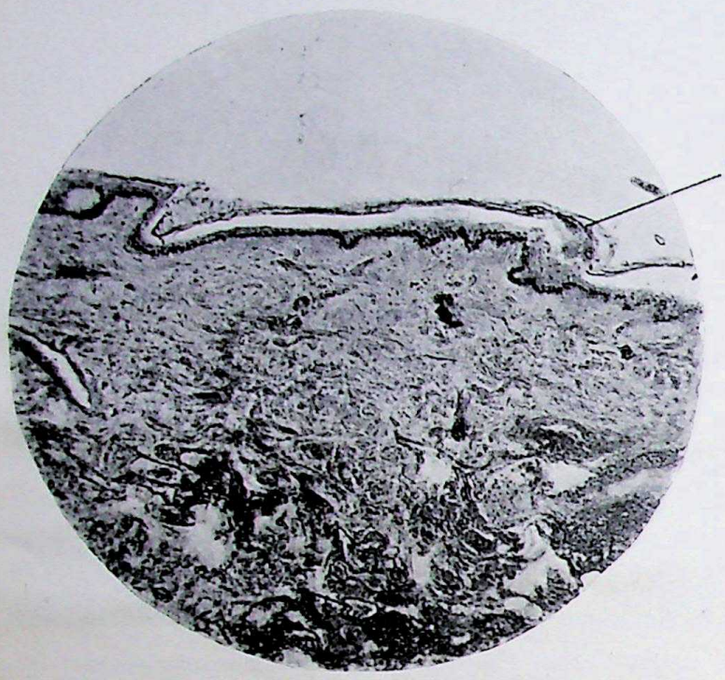

Fig. 22.—Section of the skin showing the formation of a dandruff scale, 2|3rd Objective. No. 4 Ocular, at (*i*) there are numerous bottle bacilli where the flake is breaking off from the epidermis.

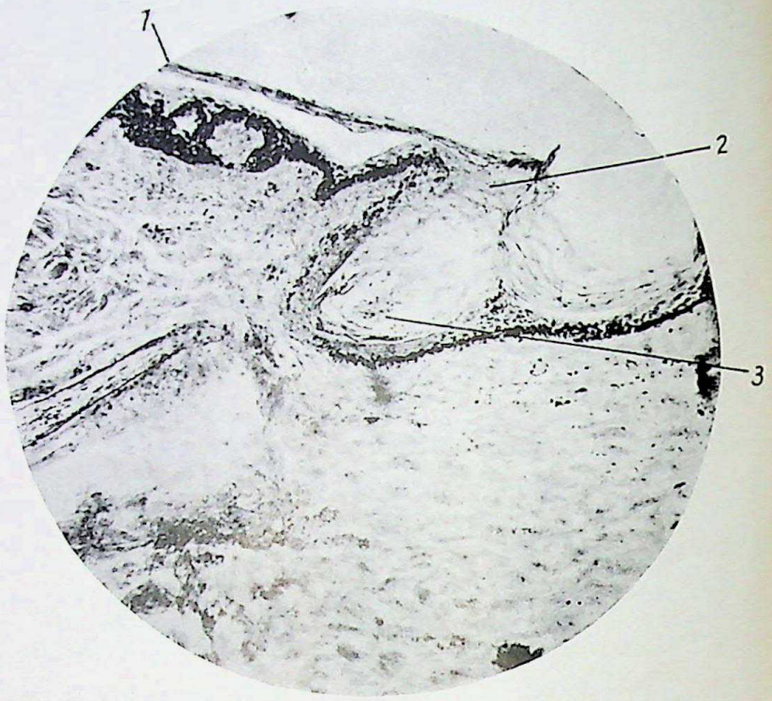

Fig. 23.—Section of the mouth of a hair follicle, 1|6th Objective No. 4 Ocular. (*i*) Desquamative scale; (*ii*) the mouth of the hair follicle filled with imperfectly cornified cells; (*iii*) numerous flask-shaped organisms.

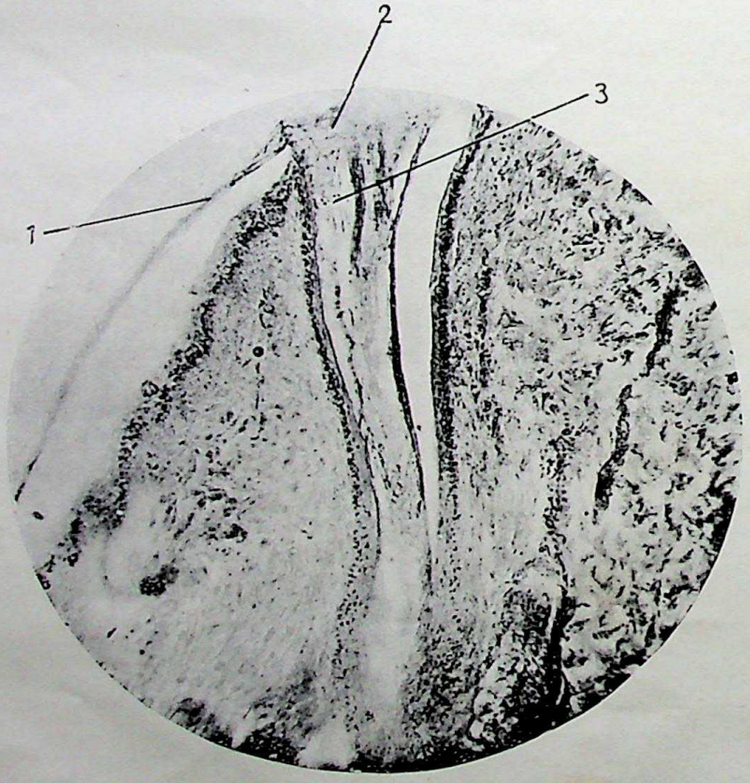

Fig. 24.—Section through the top of a hair shaft, (*i*) The scale on the scalps; (*ii*) the hair follicle mouth filled with imperfectly cornified cells; (*iii*) the flask-shaped bottle bacilli, 1|6th Objective. No. 4 Ocular.

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the skin surface to the mouth of the hair follicle. The extension usually takes place between the ages of 25 to 45. The horny layer inside the follicle fails to keratinise, and the mouth of the hair follicle is seen to be filled by these large swollen cells. Deep down in the follicle are seen minute dots, the dividing yeast-like forms of the Malassezia. Plate VI, fig. 24, shows the deeper invasion of the hair follicle as far down as the pilo-sebaceous gland, which is seen surrounded by an inflammatory reaction of leucocytes. One also observes that the mouth of the hair follicle is widely opened owing to the pressure exerted by the distension of these cells between the hair shaft and the mouth of the follicle. Plate VII, fig. 25, shows a section through the hair shaft in a more advanced stage of the infection. The hair is distorted in shape, and the shaft is filled by micro-organisms resembling staphylococci, that have stained darkly. There is an inflammatory reaction on both sides of the hair follicle. Plate VII, fig. 26, a microphotograph which was taken with a 1|12 in. objective, shows the micro-organisms inside the hair follicle at the point where the hair shaft meets the inner keratinised layer of the hair follicle. The bloated appearance of the cells that have failed to keratinise is well seen, and a few dividing yeast-like forms as larger dots, and numerous finer dots, the morococcus of Sabouraud; both these forms are the *Malassezia ovalis* multiplying by different types of division.

So far we have only followed the invasion of the hair follicle by the *Malassezia ovalis;* we must next consider the changes that take place in the hair-root, and give rise to its atrophy and the subsequent baldness (alopecia). Plate VII, fig. 27, shows the changes in the cells at the mouth of the hair follicle, but deeper down the hair-root is seen surrounded and filled with an inflammatory exudate. In this area a few coccal forms are seen, but it is difficult to determine whether these forms are the Malassezia or a secondary staphylococcal invasion of the hair-root. Plate VIII, fig. 28), shows the final stage of atrophy (alopecia) and was taken from the bald area of the scalp. The dandruff has disappeared from the surface, the epidermis is very thin and atrophied, whilst the corium consists of dense white fibrous tissue, giving rise to the glazed scarred appearance of the skin on a bald head. The follicle mouth is very small and shrunken, and where the hair follicle was, is now occupied by a thin fibrous scar, that has destroyed the hair-root and caused permanent baldness.

The extension to those sebaceous glands not connected with the hair.—This extension may occur in infancy, when it affects mainly the sebaceous glands in front of the chest (grouped comedones); in young and middle life as acne; and still later in life as sebaceous cysts.

In these areas the sebaceous glands are larger and more racemose than those connected with the hairs. As the Malassezia invades the gland mouth, it causes the cells to disintegrate more rapidly than normally, because at this site there is very little transformation of horny cells into sebaceous material. The cells that are destroyed by the Malassezia are more resistant and block the mouth of the gland by a fatty plug; the external part gets impregnated with dirt and forms the blackhead, filling the large sebaceous gland mouth. The sebum flow is now blocked and collects behind the plug and distends the gland (comedo). This sebaceous plug, which on expression comes out like a little coiled worm has been named by Sabouraud as "the seborrhœic cocoon." These plugs are completely soluble in ether, showing that they do not consist of keratinised cells but only of fatty material.

Plate VIII, fig. 29, shows the appearance of one of these obstructed glands in acne vulgaris. The solid plug at the surface infiltrated with dirt is distinctly seen, situated below the orifice of the gland. The central plug of fatty debris is very frequently crowded with a fine felted mass of the acne bacillus.

It is evident that these bacilli have nothing to do with the production of the acneform lesions, but only grow as a secondary invader when conditions are favourable for their growth, i.e., anærobiasis and a fatty medium. The Malassezia are not seen in the sebaceous plug. As a complication, these comedones may be infected by the staphylococcus albus and aureus giving rise to acne pustules. In certain individuals some of the pustules become cicatrised superficially and give rise to keloid scars; in others the cicatrisation is deeper, giving rise to scars similar to what is seen in white spot disease, a type of morphœa. Plate VIII, fig. 30, shows the base of one of these comedones that has not as yet been invaded by staphylococci. The small atrophic portion of the sebaceous gland is seen at the bottom of the cystic dilatation. The wall of the gland is reduced to a single layer of cells, which has been caused by the excessive production of sebum from these cells. More rarely in later life, 30 to 40 years of age, the inflammation spreads from the body of the gland into the corium, usually without suppuration, giving rise to induration of the corium so that the skin becomes thick and hard. The melanoblasts are also irritated so that they secrete more pigment, giving rise to darkening of the skin (chloasma). In older persons, sometimes the gland mouth gets blocked and the lining epithelium goes on secreting sebum, giving rise to sebaceous cysts.

Mycology.

Methods of investigation.—The organisms growing in the dandruff scales may be examined by one of these two methods.

(1) In the wet state, by scraping a few scales off the lesions, collecting them on a slide; place a few drops of Ponder's stain as is used for the staining of the diphtheria bacillus. The scales are well mixed up in the stain and a coverslip placed on top of the fluid. The slide can be examined at once, and the different forms of the fungus are readily seen, stained a purple colour.

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(2) The dry method. A slide is taken that has been previously smeared with serum or glycerine albumen, and the scales from the lesion are scraped off and smeared on the albuminous surface. The scales are then fixed in a mixture of equal parts of alcohol and ether. This fluid not only fixes the scales on to the slide, but removes the fat and grease from the scales, and fixation is complete in a minute or two. The slide is then allowed to dry and is stained by Manson's borax methylene blue for a minute or so. The staining is very rapid if the methylene blue is old and has been allowed to ripen sufficiently; this is shown by the change of colour from a blue to a royal purple. After staining, the slide is washed in water, dried, and then examined for parasites. One should use a low power at first—i.e., a 2|3 in. objective to scan the slide, and find the best site for examination with the higher powers. The best site is the one where the scales are numerous, but not too thick to see through. When an area has been found the examination can be completed by using the 1|6 in. objective, to see the larger forms of the fungus, and the oil immersion for the smaller forms and cocci. The *Malassezia ovalis* as seen in the scales from seborrhœic lesions varies a great deal, depending on the stage of the disease. During the quiescent stage the most prevalent forms seen in the films are large round swollen forms, staining deeply at the periphery and almost unstained in the centre. The size of these forms are about 8 μ to 12 μ in diameter. Here and there a few of the smaller forms stain regularly a deep purple and show small buds (see Plate V, fig. 21). During the active stage of the disease, the *Malassezia ovalis* now stains regularly, a uniform purple colour. Numerous budding forms are seen all over the field, and give to the organism a shape like a gourd or flask. It is on account of this peculiar shape that the fungus has been named the bottle bacillus of Unna or the flask-shaped bacillus of Malassez. During the active stage of the disease, the older fungi, i.e., the large poorly staining round forms, are practically never seen in the films, but there are numerous small rounded coccal forms about 2 to 3 μ, i.e., larger than a coccus. These are the small coccal bodies that were described by Sabouraud as the morococcus; they are much larger than the ordinary staphylococci and are not grouped in bunches. During the stage of acute dry seborrhœa, particularly in dandruff of the scalp, and less commonly on the body, a few irregular shaped mycelial forms are seen scattered about the field. These mycelial rods are about 2 to 3 μ in diameter and about 15 to 20 μ long; they are often slightly bent and are shown in Plate V, fig. 21. During the oily stage of seborrhœa of the scalp (seborrhœa oleosa) numerous masses of staphylococci are also seen, and these cocci tend to diminish the number of the Malassezia in these scales. The reason of this diminution will be discussed when dealing with the cultivation of this fungus. Therefore in the scales derived from seborrhœic lesions we find mycelial forms, budding forms, and small coccal forms, whilst near the mycelial elements small rounded forms may be seen that are probably spores. The general appearance of the fungus shows that it is closely related to the other Malassezia, namely, *Malassezia versicolor*, and *Malassezia flava*, the cause of tinea versicolor and tinea flava, respectively.

Cultures.—At first we were unable to grow this organism in pure cultures; two or three times we obtained impure cultures mixed with staphylococci, which survived only for a few days and we were unable to obtain subcultures. We first tried all the ordinary media that are used for laboratory cultures, and in every one of them the staphylococcus grew so rapidly that it stifled the growth of the Malassezia. We next attempted to get rid of these staphylococci by various means; for example, soaking the scales in absolute alcohol for varying lengths of time, exposure to the direct sun's rays, etc., but whatever method we used, when the staphylococci were killed, the Malassezia were also destroyed by the agent. We next attempted to grow the Malassezia on sterilised scales placed on a platform of plaster of Paris, where the surface was kept moist by the percolation of sterile water from the bottom of the Petri dish through the slab of plaster of Paris. The result was a failure, as the staphylococcus and spore-forming bacteria have sufficient nourishment in the damp scales to prevent the growth of the Malassezia. It was evident that the medium we required was one that would inhibit the staphylococcus, and, which should contain fat. The first successful culture was obtained by one of us (G. P.) on Petroff's glycerinated medium. This is an egg medium coloured with gentian violet. We found that 0.004 per cent. gentian violet was sufficient to inhibit the staphylococcus but not appreciably to hinder the growth of the Malassezia. The best method of obtaining primary cultures is to scrape off the scales from the scalp or any other lesion, then wash the scales well in sterile normal saline so as to get rid of as many extraneous organisms as possible. The washed scales are placed on the upper part of the Petroff's media, where the slope has dried up; usually the primary cultures from the scales fail when the scales are placed on the thick part of the medium where it is moist. The primary cultures appear as small dry chalky white colonies when the scales have been placed on the dry upper part of the medium. The colonies are visible to the naked eye about the 3rd day or so. Secondary cultures are more easily obtainable, the fungus will now grow on the thick part of the Petroff's medium, on glucose agar, ordinary agar and even glucose broth. We believe that we are the first observers who have succeeded in growing this organism in a pure culture, and then able to subculture them.

Differential diagnosis.—The chief difficulty in the diagnosis lies in the fact that secondary infec-

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PLATE VII.

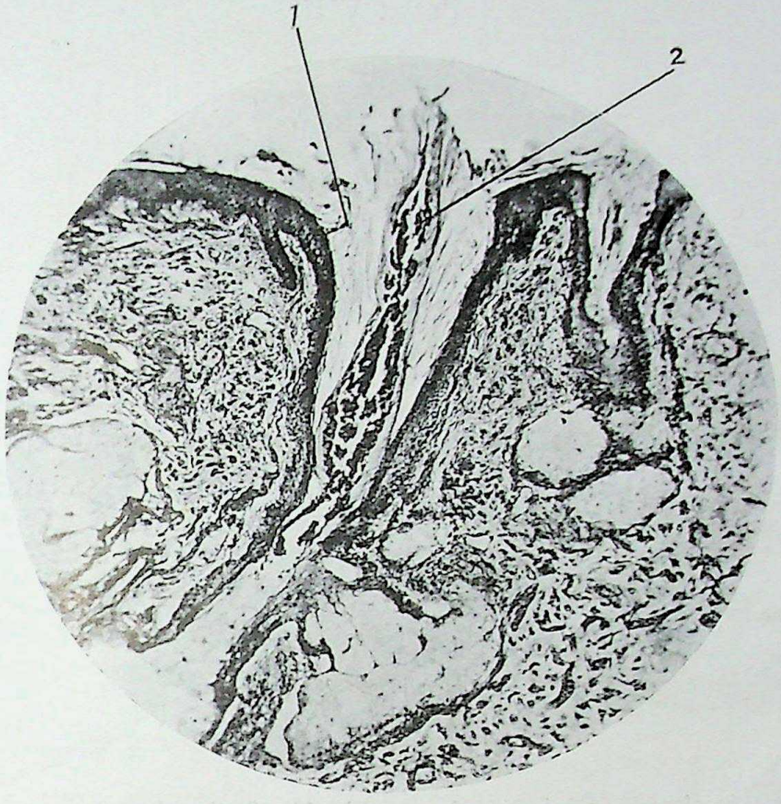

Fig. 25.—Section through a hair shaft, 1|6th Objective. No. 4 Ocular. (*i*) Numerous bottle bacilli; (*ii*) hair shaft staining deeply with a pigmented appearance.

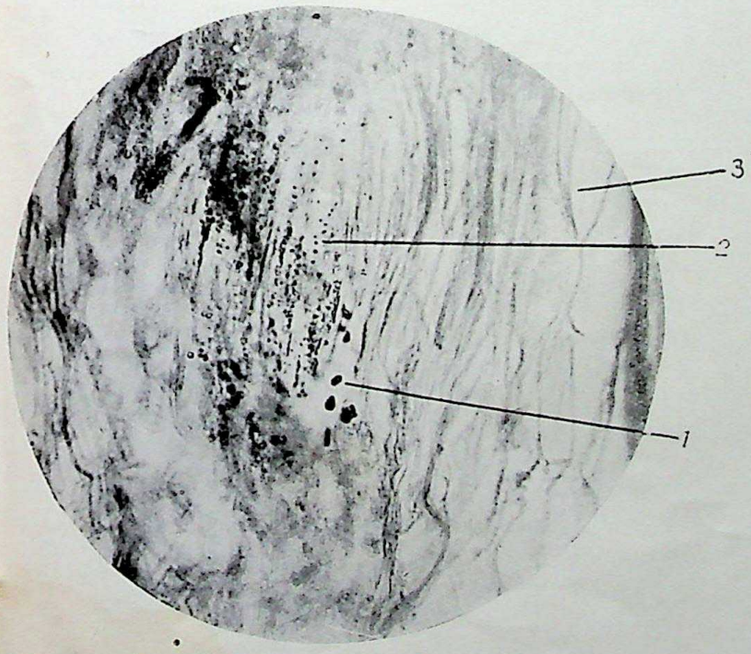

Fig. 26.—1|12th Objective. No. 4 Ocular, the site at 1 in Fig. 4, Plate IV more highly magnified. (*i*) Flask-shaped forms; (*ii*) morococcal forms; (*iii*) swollen uncornified epithelium.

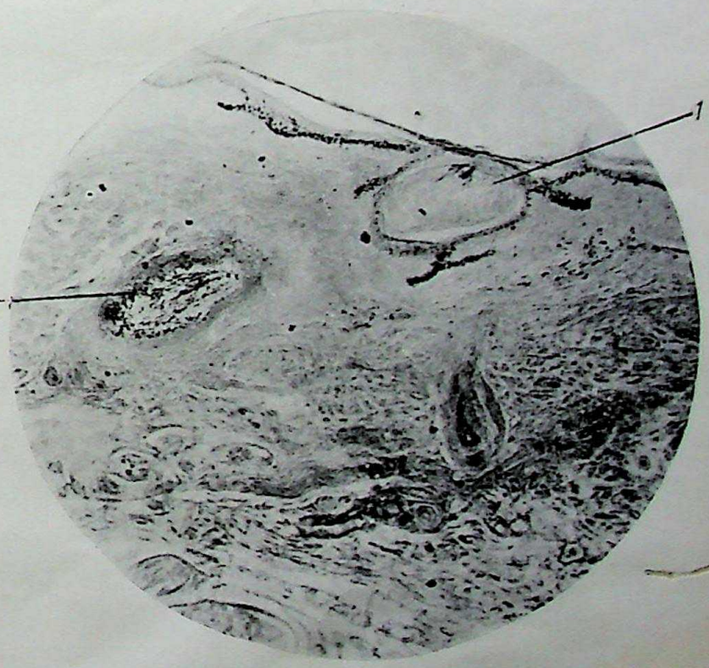

Fig. 27.—Section of a hair follicle more advanced alopecia, 2|3rd Objective. No. 4 Ocular. (*i*) The distended mouth of the hair follicle; (*ii*) hair shaft surrounded and infiltrated by an inflammatory exudate.

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PLATE VIII.

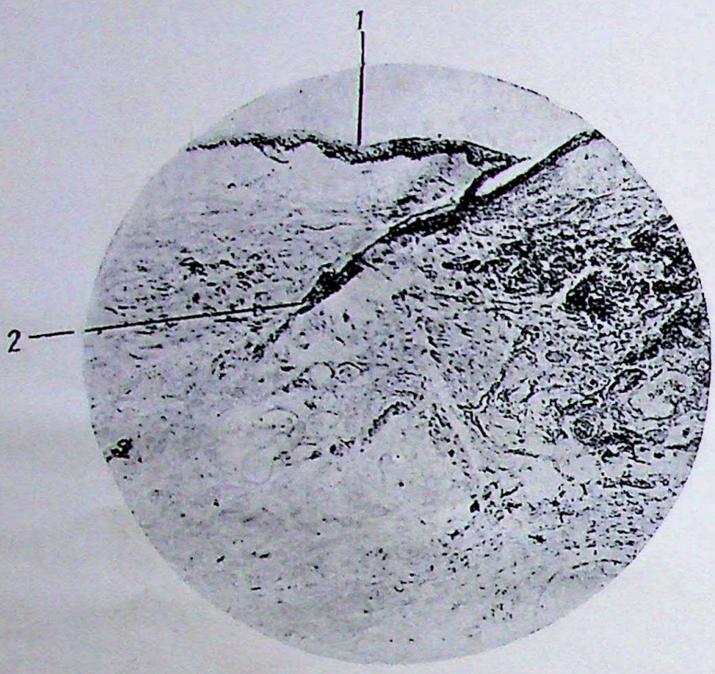

Fig. 28.—Section of the bald area in alopecia, 2|3rd Objective. No. 4 Ocular. (*i*) Thinned epidermis; (*ii*) scar in the hair shaft.

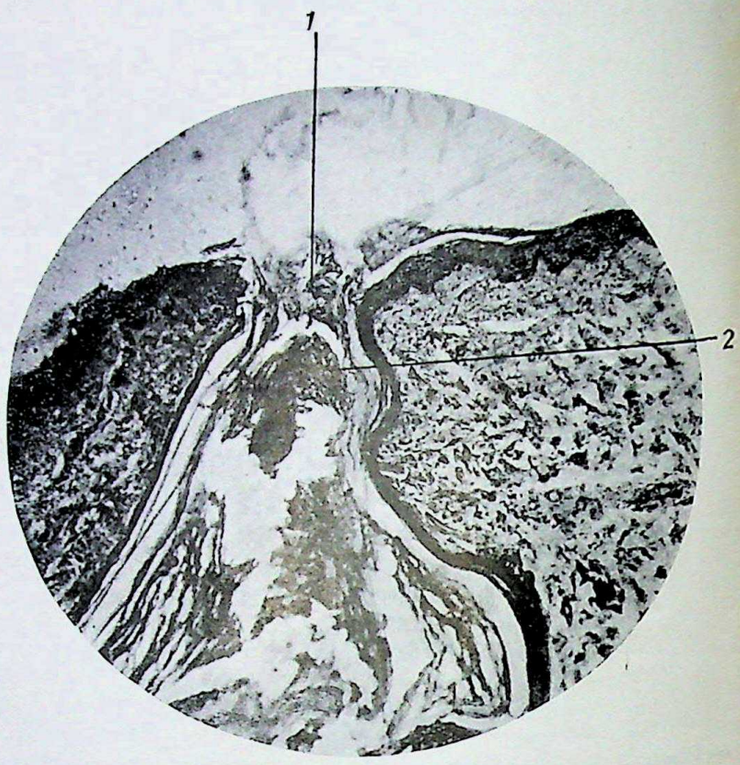

Fig. 29.—Section through a comedone. No. 4 Ocular. 1|6th Objective. (*i*) The loose mass of scales infiltrated with dirt; (*ii*) the semi-cornified mass blocking the mouth.

Fig. 30.—Section through the base of the comedone. (*i*) Sebaceous material with acne bacilli; (*ii*) thinned epithelium of the sebaceous gland; (*iii*) remains of the sebaceous gland.

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Fig. 1.—Acute Seborrhœic dermatitis with secondary streptococcal infection, Eczema rubra.

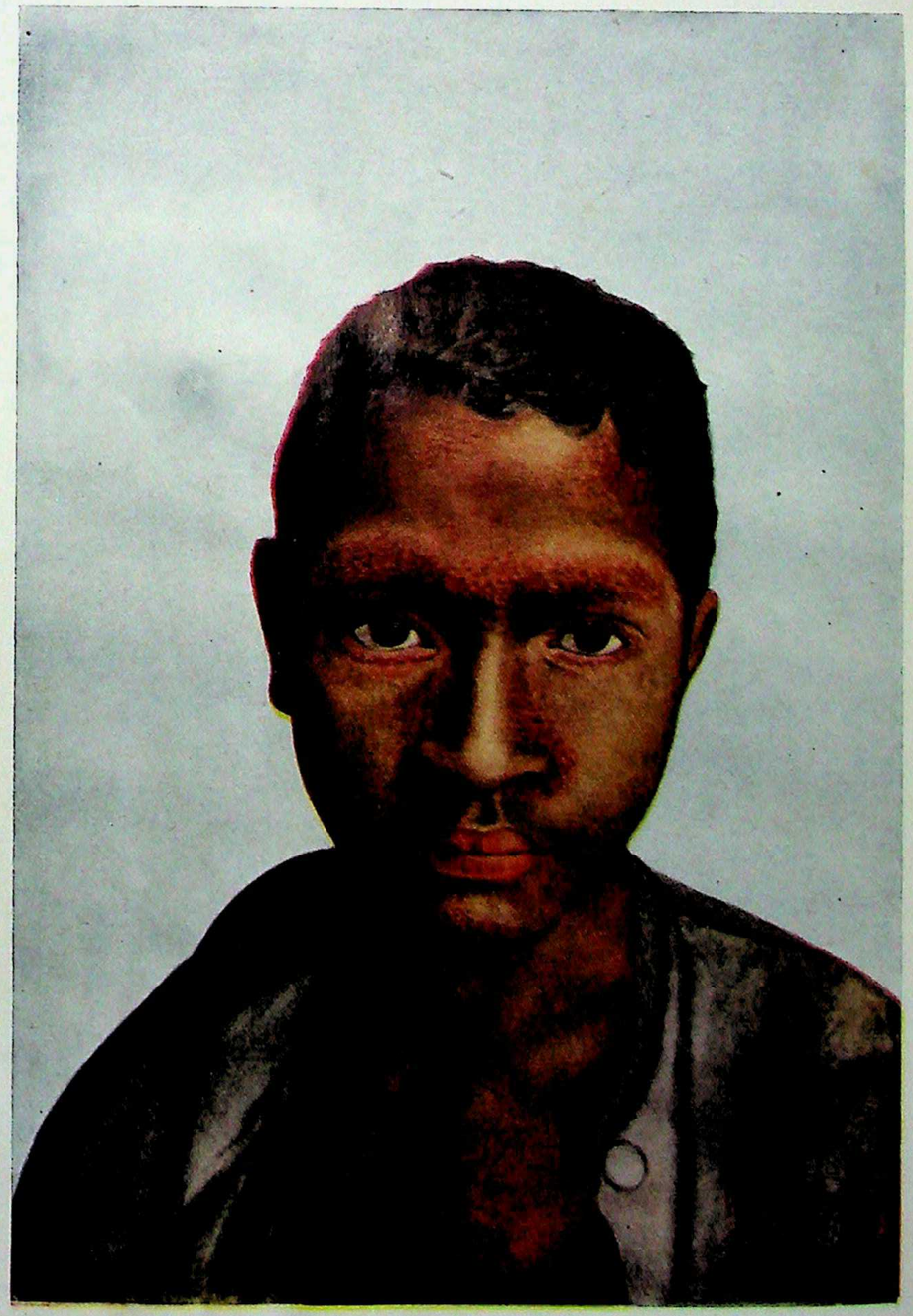

Fig. 2.—Seborrhœic dermatitis with extensions on to the forehead, eyebrows, eyelashes, naso-labial fold and chin.

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tions are very apt to occur on the seborrhœa and mask the whole aspect of the lesion. This is particularly liable to take place in the very young and in the old, because as the result of the irritation, the surface skin is scratched and excoriated, leaving a path for other organisms to invade the corium. In children the commonest infection is due to streptococci causing impetigo. The disease can now be carried to other parts of the body by the child scratching the impetigo sore, and conveying the streptococci on the fingers or nails to other traumatic lesions like mosquito bites, etc. Another type of the streptococcal lesion is the eczema rubra of children, when the whole of the surface of the skin of the face or legs becomes raw and weeping. In the old, the disease is most persistent about the flexures of the joints, and the skin in this area often becomes lichenified. We consider that most of the so-called eczemas seen in the very young and old are primarily due to seborrhœa.

We have already stated that there are three periods of life when the Malassezia invades the skin. In infants, we have therefore to diagnose cases of impetigo and eczema rubra from seborrhœa of the scalp or face, and whether the lesion is primary or secondary to seborrhœa. Often one has to wait and see the effect of the treatment on the impetigo or eczema before one is quite certain. In adolescence, dandruff of the scalp and acne of the face are the two commonest lesions seen of seborrhœa. The scalp is very rarely examined, nor is any attention paid to the slight amount of dandruff that may be present; and many of the abscesses of the sebaceous glands about the eyelids, ears, etc., owe their origin to the staphylococci that are commonly present on the scalp in seborrhœa. There are numerous lesions that one has grouped under this heading, viz., acne, exfoliative cheilitis, etc. These are not special diseases, but are only local manifestations of seborrhœa. In adult life we have to consider the various types of baldness that attack the scalp. The commonest cause of baldness at this age is seborrhœa, which attacks the forehead or the crown until the whole of the upper part of the scalp is denuded of hair. Occasionally the very severe types of baldness due to alopecia areata and Lorrain's type may involve the whole of the scalp, but can be easily recognised.

We need not consider the alopecia that occurs in secondary syphilis, as the baldness is partial and the scalp presents a moth-eaten appearance. Still later in life when seborrhœic warts develop and tend to ulcerate, one has to consider the onset of malignant disease. In the very severe types of seborrhœic dermatitis where the whole body is involved, there is some underlying cause, the lesion has to be diagnosed from acute exfoliative dermatitis. In India injections of the aromatic compounds of arsenic are very frequently given for any skin disease in the hope that the lesion may be of syphilitic origin. The doses given are generally too large in proportion to the poor physique of the patient, with the result that an arsenical dermatitis is set up. One has seen such a condition with seborrhœa and psoriasis. There is another factor that we have recently found, and that is, that in the basal layer of coloured races there is some substance which is capable of reducing the silver in Levaditi's stain to the black silver oxide. It is possible that this substance may be capable of attacking the aromatic compounds and forming arsenious oxide, or metallic arsenic in this situation. Occasionally there may be a widespread infection with streptococci (acute eczema) which masks the disease. In these cases one has to treat the acute eczematous condition first, and as it subsides the parasitic lesion becomes apparent. In the Indian, it is very difficult to diagnose patches of tinea vesicolor and flava from seborrhœa, when these lesions are situated about the nose and chin. In these cases, one has also to examine the lesions when the causative fungus will be readily found in the scrapings. The final test to confirm one's clinical diagnosis of these cases, is to scrape the lesions and actually find the fungus. We are convinced that if dermatologists used their microscopes more frequently to confirm the clinical diagnosis made by their naked eyes by bacteriological methods we would have less differentiation of lesions as separate diseases, when they should be under a single heading if the actual causative agent was worked out in each case.

The different lesions that we have described on the skin, in the hair and the sebaceous glands are all due to the invasion by a single fungus; the *Malassezia ovale*.

Treatment.

In considering the treatment of seborrhœa, we must first recognise that the scalp is the primary site of the disease. It is always involved and forms the source of supply of the Malassezia, which then invades other parts of the body. If scalp is not treated it is impossible to control the disease, as it spreads to other parts of the body in an apparently mysterious manner as soon as the treatment of the skin has been discontinued by the patient. Very few physicians pay any attention to the lesions of the scalp, especially when the rash happens to be situated in some remote area, for example, flexures of the joints, etc.

The second point to realise is that the treatment of the scalp must be continuous, and we consider that no remedy is sufficiently powerful to eradicate the disease completely from the scalp. The disease can easily be controlled, but as soon as the treatment has been discontinued, the Malassezia again appears, so it is difficult to tell whether this is due to a re-infection, as the soil is a suitable one, or a recrudescence of the disease, owing to the fact that the parasites have not been completely destroyed by the treatment.

When these two essential facts, i.e., that the disease is a primary one of the scalp, and that it is difficult to cure completely—are fixed in the mind, we are now in a position to discuss the treatment of seborrhœa. The disease is somewhat different in young children, so we will consider their case

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first. When the scalp is infected and is covered with greasy scales without inflammation; these should be softened with warm olive oil overnight when the scales are heaped up; a ½ per cent. mercury oleate dissolved in olive oil should then be used. The oil should then be washed away with soap and water. If the scalp is free from scales a lotion containing 5 to 10 grains of resorcin should be rubbed into the hair-roots night and morning for several weeks. If impetigo is present as is shown by the superficial ulcerations, and the formation of yellow coloured scabs, the scalp should first be treated by a weak ammoniated mercury ointment, i.e., 5 to 10 grains of hydrarg ammon in an ℥i ointment base such as Unguentum rosæ (B. P.). If the eczema rubra is on the face and body, provided that impetigo is not superadded, one first applies the Lotio calaminæ (Extra B. P.), using it is an evaporating lotion by dabbing it on to the parts affected as frequently as possible or covering the lesion with lint that is continually being soaked in the lotion. In a short time the acute inflammation will subside and the skin will tend to become dry and cracked, one can then use some simple ointment for a day or so. The best application for eradicating the disease is resorcin, which should be used as an ointment starting at 5 grains to the oz. and increasing up to 15. The lesions on the body very soon clear up and the treatment of the scalp should be continued for several weeks after, otherwise relapses will occur.

We will now consider the treatment of seborrhœa in the adult, and it is best considered under three main headings:—

(*a*) Pityriasis capitis, of the dry or oily type, with baldness coming on later in life. Here the first essential point is the mechanical removal of the scales by washing; this is best carried out by the use of a soap spirit lotion; we generally employ the following:—

Saponis mollis, 1 part.
Spirit Vini rect, 2 parts.
1 dr. of Tincture of lavender may be also added.

About ½ an ounce to an ounce of the lotion should first be well rubbed into the scalp until the spirit has dried by evaporation; this takes about a couple of minutes, the soap is then worked up into a lather and rinsed with plenty of fresh water. The usual prescription is double the quantity of soap to that of spirit, but it leaves the hair very sticky. The hair should be washed daily with this lotion at the beginning of the treatment, and in cases of women the lotion has to be used less frequently. The Indians employ an infusion of the soap-nut (sapindus trifoliatus). The infusion is made by soaking the nuts overnight in boiling water, removing the seeds from the outer shell and straining the decoction through muslin. This infusion forms an excellent shampoo, as it cleans the hair and scalp and leaves the hair soft, but the large amount of saponin present is very irritating if the slightest drop gets into the eye. Rinsing the hair too frequently with plain water as is done by many men, makes the hair and scalp dry and tends to promote the development of seborrhœa. If the scales are thick as in seborrhœa oleosa, they are best removed by softening the scalp, using a 1 per cent. oleate of mercury dissolved in olive oil applied during the night, and in the morning washed away with the soap spirit lotion. In the treatment of seborrhœa itself of the scalp various remedies have been employed: sulphur is the most powerful, but it is difficult to use on the scalp on account of its colour and smell. One therefore uses it only in the more severe cases of seborrhœa; when the scalp and forehead are very red and inflamed, the disease should first be soothed by the use of glycerin subacetate of lead 1 dr. dissolved in ½ a pint of water and applied frequently to the scalp. Sulphur may be prescribed in various ways. In the severe types of dandruff and if the scales are abundant, one generally uses an ointment of from 10 to 30 grains of sulphur and camphor. The camphor seems to enhance the action of sulphur. Sulphur precipitata may be prescribed with salicylic acid, 15 grains of each to the ounce. Next morning the ointment should be washed away and the lotion applied. A good method of applying sulphur in a cleaner manner is to rub first of all the scalp with the following solution: hyposulphite of soda 20 grains, Eau de Cologne ℥i, water to the ℥i. After this has dried then apply the following solution; tartaric acid 4 grains, water to ℥i; this sets free the nascent sulphur in the hyposulphite. The sulphur treatment should be employed once or twice a week, preferably at the week end, and during the week one generally uses a lotion containing resorcin or euresol. A word of caution should be added, that sulphur cannot be used on the skin and followed by any formulæ containing mercury perchloride until the sulphur has been completely removed from the skin, otherwise sulphide of mercury will be formed at the mouth of the sebaceous glands, and the whole area will be covered with a crop of pustules.

Resorcin is the next best remedy after sulphur, but it is apt to stain fair hair a dirty greenish colour. Euresol which is a mono-acetate of resorcin is free from this objection, and can be used for fair hair. We employ the following lotion:—

Resorcin ..	.. 10—20 grs.
Ammon. chlor.	.. 10 grs.
Glycerine ..	.. 20 mins.
Eau de Cologne	.. 1 dr.
Aqua rosæ ..	.. ad. 1 oz.

The euresol lotion is prescribed as follows:—

Hydrarg. perchlor	.. ¼—1 gr.
Euresol ..	.. 15—40 grs.
Spirit ætheris ..	.. ½ dr.
Spirit rosemari	.. 1 dr.
Ol. ricini ..	.. 4—10 mins.
Aqua rosæ ..	.. ad. 1 oz.

Perchloride should be prescribed first in small doses of ¼ of a grain to the ounce, and the amount of castor oil varied with

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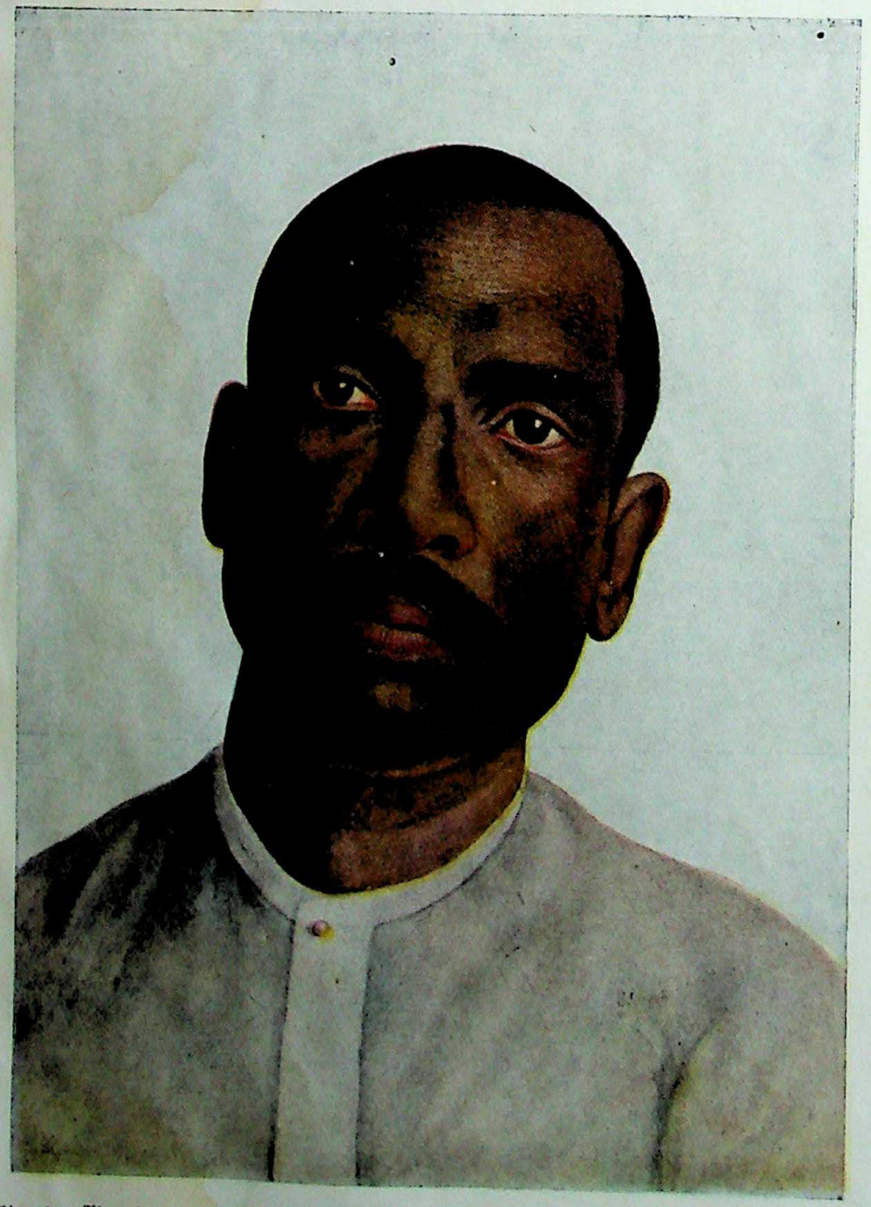

Fig. 1.—The deep type of seborrhœic dermatitis involving the skin of the face and causing hyperpigmentation.

Fig. 2.—Seborrhœic dermatitis of the front of the chest. Flannel rash. Note the greasy appearance of the scales and the slightly reddened base.

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the greasiness of the scalp. The lotions should be well rubbed into the hair-roots night and morning when the hair is being dressed. From experience one finds that it is often necessary to change the remedy from time to time, as the lotion appears to lose its power in checking the growth of the bottle bacilli. When the hair is falling out some use a stimulant in addition, such as ammon. chlor, cantharides, etc. We believe that it is much more important to control the disease, and then the hair will return in time. If the hair-roots have atrophied completely and the skin of the scalp is tense and shiny, the seborrhœa has died out, and the only thing one can do is to stimulate the few surviving hair-roots that have escaped destruction by the disease.

(*b*) *Acne.*—The treatment of acne depends in the first place on controlling the disease in the scalp as mentioned above. The local manifestations of acne can be dealt with in various ways; first the surgical treatment, i.e., the expression of the comedones. This is best done by using an ether lotion or the spirit soap lotion in order to remove the scales round the sebaceous mouths, and then to express the comedones mechanically. There are various expressors on the market, the cheapest and the best is a drawn out piece of glass tubing with the ends rounded off by heat, and the hole of sufficient size to surround the gland mouths. The tube is placed over the blackhead and pressed on to the skin, and the comedo comes out as a worm-like structure in the glass tube. A few comedones should be removed at each sitting, and they should be taken from various places on the face so as not to be too close together, otherwise one is apt to get an infection of the skin with the formation of pimples. At night time a lotion containing 20 grains of sulphur precipitata and 10 grains of camphor with 10 grains of tragacanth to an ounce of water should be rubbed on to the face. During the day the skin is kept free of fat by the use of a bland face powder. When the lesions are severe, we generally use a white sulphur lotion which is made up as follows:—

Zinc sulphate	.. ..	20 grs.
Potassium sulphide	.. ..	20 grs.
Water to the ounce.		

The ingredients should be dissolved separately and the sulphide should be fresh; the two solutions are then heated and mixed whilst warm. The efficiency of this lotion depends on the liberation of H_2S, so that it is necessary to have the sulphide fresh, and to aid the decomposition by having both solutions warm. The lotion should be kept in a bottle with a glass stopper and small quantities should be made up from time to time. The lotion may be used 3 or 4 times a day, and continued until the skin loses its greasy appearance and becomes tight and drawn. After about 7 to 10 days of treatment, the desquamated skin begins to crack and peel off, and the lotion should then be applied less frequently. If the face gets very sore owing to the dryness, the following ointment can be put on at night.

℞

Glycerini Amylum	gr. āā
Ung. acid salicylic	

This is a very intensive method of treatment, and can only be employed when the patient is able to stay indoors in order to follow out the treatment. After this course has been completed, the sulphide lotion should be employed once or twice a day according to the amount of irritation it produces on the skin. In severe cases a good deal of keloid formation takes place, and it may be necessary to use *x*-rays, employing ¼ to ½ pastile dose once a week for 4 to 6 weeks. It is safer to use small doses as the skin is often very sensitive to the rays. During exposure it is necessary to protect the face, eyebrows and other hairy regions that may be affected by the rays.

The commonest complication is a secondary staphylococcal infection with the formation of pustules or deep boils. The question arises as to the surgical treatment of these lesions. As a rule it is better to leave them alone when they are deep seated under the corium, as an incision will only leave an ugly scar. Many of these deep seated boils do not break down, but are slowly absorbed without a superficial scar. When the pustules are superficial and have come to a definite head, they should be opened up with a fine linear cataract knife, the pus squeezed out and the point touched with iodine. It is better to employ a cold lotion like lotio calaminæ to allay the inflammation, rather than use hot fomentations, as they only tend to spread the infection. When keloids or numerous morphœa-like scars are forming, we generally prescribe the following powders; thyroideum siccum ¼ grain, gonad siccum 2 grains, to be taken night and morning on an empty stomach. Some observers recommend the injection of Collosol manganese, ½ to 2 c.c. injected for 6 days. We have employed this treatment and have found it occasionally useful. We have used vaccine therapy, utilising the three staphylococci, *albus, aureus* and *mollis,* and the results have been very uncertain. The best results with vaccine therapy are obtained when the pustules are deeply seated. At the most vaccines can only deal with the secondary staphylococcal infection and not with the cause of the disease—the Malassezia parasites. We have also added the acne bacillus to the above vaccine, and have not seen any better results than with the staphylococcal vaccine. One gets far better results by the proper local treatment of the acne than by vaccine therapy.

(*c*) *The treatment of seborrhœa on the skin of the body.*—On the body we see seborrhœa as an acne of the chest, and on the back as a circinate lesion, as well as an eczematous lesion at the flexures of the joints. The first essential point is that there should be no irritation from the clothing, such as wool or flannel. It is therefore better to wear silk or fine linen or cotton next to the skin. The best remedy for seborrhœa of the skin is resorcin, starting with 10 grains of resorcin to the ounce of ointment base and

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increasing it gradually up to 30 grains; the ointment is put on at night. After the morning bath, a little sulphur camphor powder is dusted very lightly with a powder puff over the parts affected. One should warn the patient that sulphur is an irritating drug, and the skin should be *lightly* dusted. We have known patients to get through a pound of this dusting powder in about three days time, and come back suffering from sulphur dermatitis. When the skin is lichenified, with cracks and secondary infection by streptococci, it is better to use first a calamine lotion until the acute stage has passed off, and then commence carefully with weaker strengths of the ointment. One sometimes uses the lotion during the day and the ointment at night as it can then be tolerated better by the patient. In the resistant cases of seborrhœa, particularly when situated about the eyebrows, upper lip, back of the neck and flexures of the limbs, the best remedy to employ is a 5—10 per cent. silver nitrate solution. This will act when all other remedies have failed to cure the disease.

As regards the general treatment, i.e., to alter the fatty condition of the skin which is often inherited; in these cases the value of endocrine therapy becomes apparent, as they do well on small doses of thyroid given in conjunction with the gonads. Certain foods, such as an excessive amount of fats, sugar or starches, and the use of alcohol increase the local condition of the skin and so predispose to seborrhœa. In India during the very hot weather one commonly sees seborrhœa of the scalp and forehead extending on to the body as prickly heat.

With regard to prickly heat, as a manifestation of seborrhœic dermatitis combined with an excessive amount of perspiration, Smith (1927) states, that prickly heat is a dermatitis of mycotic origin, and the causative agent belongs apparently to the monilia group. He suggests in the note that one of us (H. W. A.) apparently does not know the difference between a bottle bacillus and his fungus. The disease he describes as prickly heat is a very rare condition in this country and is due to an endomyces, and not a monilia in the strict sense. In the *Journal of Tropical Medicine and Hygiene*, the leading article, "Prickly heat," suggests that it has been proved that it is due to a mycotic dermatitis. During the hot weather one of us has has experimented on himself, leaving the condition of the seborrhœa of the scalp untreated with the result that he has suffered worse this year than any previous years, and during this time he never once became infected with the endomyces fungus that Smith describes. The prickly heat that Smith describes is a vesicular mycotic infection of the skin; the vesicles when recently formed, are raised with milk white contents and surrounded by a purple base. On healing it leaves a discoloured patch for some weeks. We have only seen the disease in debilitated individuals, and in sailors from the various ships that come into this port, but with us the disease is extremely rare.

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A PRELIMINARY REPORT OF WORK CARRIED OUT BY THE CHOLERA BACTERIOPHAGE ENQUIRY.

By F. D'HERELLE, M.D.,

and

R. H. MALONE,

MAJOR, I.M.S.,

Central Research Institute, Kasauli.

(Enquiry carried out under the Indian Research Fund Association, 1927.)

FROM April 27th to June 20th, 1927, we studied in detail 23 cases of cholera undergoing treatment at the Campbell Hospital, Calcutta. A large number of other cases of cholera were also studied (about 50), and as far as the incomplete experiments showed, the results were identical with those described below.

The observations made concerning the behaviour of the bacteriophage during the course of the disease may be summarized as follows:—

During the period mentioned the bacteriophage seems to have been extremely widespread in Calcutta, for we were able to isolate bacteriophages virulent for vibrios from the intestinal contents of the patients immediately after their admission to hospital, i.e., from 10 to 20 hours after the onset of the disease.

(1) However, in three of the cases studied, the bacteriophage was not present in the intestine on admission to hospital, and these cases all died a few hours after admission.

In this connection it may be mentioned that in 1921, while in Indo-China, the senior author was unable to isolate bacteriophages in 100 cases of cholera, all of whom died.

(2) In 2 cases a *strong* bacteriophage was present in the first stool passed after admission. These two patients recovered in an extremely rapid manner and were discharged from hospital 2 and 3 days respectively after admission, in spite of the apparent gravity of the symptoms at the time of admission.

(3) In three cases, all of whom died, the bacteriophage was weak from the onset, became still weaker, and finally disappeared.

(4) In the great majority of cases (13 out of 23) the virulence of the bacteriophage fo the

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cholera vibrio, feeble at the onset, became exalted in a fairly rapid manner, and attained its maximum potency 24 to 48 hours after the onset of the disease. All these cases recovered, improvement commencing from the time when the bacteriophage was capable of producing complete bacteriophagy *in vitro*.

(5) In two cases there were fluctuations in the activity of the intestinal bacteriophage; weak at the beginning, it increased rapidly in potency, then diminished and again regained its power. With this reappearance of potency the patient's convalescence commenced.

Finally:

3 cases, no bacteriophage present on admission: 3 died within 24 hours.

3 cases, bacteriophage feeble and then disappeared: 3 died within 24 hours after disappearance.

2 cases, strong bacteriophage at the moment of the admission: 2 prompt recoveries.

13 cases, weak bacteriophage, the potency of which rapidly increased, 13 delayed recoveries.

2 cases, the power of the bacteriophage fluctuated, but finally became potent: 2 delayed recoveries.

Those experiments show that in cholera the end result, recovery or death, is intimately associated with the behaviour of the intestinal bacteriophage.

All the patients observed were treated by Roger's method of intravenous saline injections, which we may remark *en passant* is entirely rational: it prolongs the life of the patient until such time as the bacteriophage has become sufficiently exalted in virulence to overcome the pathogenic vibrios. This treatment is ineffectual when the bacteriophage is absent, as in the six fatal cases studied by us.

The power to attack vibrios is not the same for all races of bacteriophage. Experiments have shown that certain races are capable of destroying in 3 or 4 hours all the vibrios of a culture. Others are much weaker and can only reduce the number of vibrios, without destroying them all.

Success in the treatment of diseases by means of bacteriophages depends *entirely* on the potency of the bacteriophage introduced into the organism of the patient. Then the first thing to be done before considering the question of treatment was to choose the most potent races of bacteriophages from amongst those isolated from the patients studied. Two such were provided by the two patients in whom bacteriophage was potent from the beginning and who recovered very rapidly. But we have further attempted to obtain, and have in fact obtained, a further exaltation in potency by the passage of these races through other patients. We were then ready to conduct experiments in the treatment of cholera by bacteriophage.

Experiments carried out in the Punjab, July 7th to August 9th.

First we have verified the facts observed in Calcutta. Here also, recovery or death depends entirely on the behaviour of the bacteriophage.

Further, we have studied the course of events in cholera epidemics in villages. Unfortunately (with but one exception) we have always received the information of the outbreak of epidemics some days after the onset. At this time the bacteriophage is extremely widespread in the environment, principally in well water and in flies, and it has been possible to isolate very potent races of bacteriophages from these sources.

We have also observed in a village which has not been infected with cholera during the year, that neither the well water, nor flies caught in the village contained any bacteriophage virulent for cholera vibrio.

From those facts it would appear that the bacteriophage virulent for cholera vibrio is not present in the environment before an epidemic, but only makes its appearance during the course of the epidemic.

This is our explanation of the course of a village epidemic, based on the facts observed in India, as well as on facts observed in the course of epidemics of bacillary dysentery in man and various epizootics in animals (fowl typhoid, hæmorrhagic septicæmia in buffaloes, and plague in rats).

The cholera vibrios are imported into the village, or the town, with the first case; from the first case they are disseminated by direct contact, by means of flies or well water. All patients in whom the intestinal bacteriophage remains inert towards the cholera vibrio succumb, and they are in the majority. There are some others, however, in whom there is a rapid exaltation of the virulence of the normal intestinal bacteriophage towards the cholera vibrio, and these individuals enter into convalescence. Virulent bacteriophages from these convalescents are passed with the stools, and are spread in exactly the same manner and by the same agents as are the pathogenic vibrios. In a word, at the beginning there are disseminated into the environment the cholera vibrios, and this is the period of the propagation of the disease. Then from the first convalescent there are disseminated the bacteriophages. As more and more patients recover, the bacteriophages become more and more disseminated, and the epidemic declines, finally to cease when "contamination" by the bacteriophage becomes general.

Finally, we have carried out experiments in the treatment and prevention of cholera. As we have said before, generally the epidemics are not reported by the headmen of the villages until they are nearly over. For that reason we have not been able to treat as many cases as we should have wished, for in only four villages could we initiate treatment at a stage early enough to have

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a fair mortality amongst the non-treated cases; those were generally treated by the mixture of essential oils.

The results of those experiments are given below.

Names of the villages	Dates.	Cases *not treated* by bacteriophage.		Cases *treated* by bacteriophage	
		Cases.	Deaths.	Cases.	Deaths
Ghawinpi	before				
	13-7	9	8	..	..
	14-7	2	2	11	0
	15-7	3	1	1	1
	16-7	2	2	..	..
		16	13	12	1
Waigal ..	13-7	15	8	..	..
	14-7	9	0	..	..
	15-7	15	13	1	0
	16-7	0	0	7	0
	17-7	1	5	4	0
	18-7	2	0	1	0
	20-23-7	?	(8)	0	1
		42	26+(8)	13	1
Jaman ..	6-15-7	25	17	1	0
	16-7	..	2	4	0
	17-7	..	..	3	0
	18-7	..	..	1	1
	25-30-7	(42)	(19)	..	..
		26	19	9	1
Rajiana ..	21-7	13	0	5	0
	22-7	5	2	2	0
	23-7	5	4	..	..
	24-7	0	1	..	..
	25-7	0	1	..	..
	26-7	0	2	..	..
		23	10	7	0

As we have said before, in only one instance the health authorities were advised by wire of an outbreak of an epidemic in a village, Nawar. We here availed ourselves of the opportunity of undertaking a trial of prophylaxis.

Nawar is a village of 345 houses, the majority of the population being Jats. It is provided with water by 13 public and 9 private wells. Six cases occurred on the 2nd of August with 3 deaths, and 6 cases on the 3rd with 2 deaths. On the 4th of August 30 c.c. of a culture of a selected bacteriophage were added to each of the two Jat wells supplying the contaminated area. Not a single case of cholera has been reported since; all the patients who were Jats and drank water from those wells recovered.

This single experiment evidently is lacking in any value by itself, but it must be remarked that the senior author conducted extensive experiments in fowl typhoid, since confirmed in Holland, with the result that in every case the epizootic stopped immediately after experimental spreading of the bacteriophage in the environment.

We must remark that by the use of cultures of selected virulent bacteriophages we have reproduced experimentally the natural process of the recovery, as well as the natural process by which epidemics come to an end. But in the natural way, the exaltation of the virulence of the bacteriophage (contained in the intestine of every man or animal, but normally not virulent for the cholera vibrio), for the pathogenic vibrio depends on favourable or unfavourable circumstances which may occur sooner or later in the course of the epidemic.

Experimentally, we can choose a race of the most virulent bacteriophage, already adapted to the rapid destruction of cholera vibrios. We can spread cultures of it over or at the very beginning of an epidemic more widely and more rapidly than is possible in the natural course of the events.

THE WALKING CALIPER SPLINT AND ITS USES.

By W. L. HARNETT, M.A., M.B., F.R.C.S. (Eng.),
LIEUT.-COL., I.M.S.,
Officiating Professor of Surgery, Medical College, Calcutta.

When a fractured femur has consolidated so that no mobility at the site of fracture remains, the new bone is not at first strong enough to bear the weight of the body. If it is subjected to this it may break or more frequently it may bend. It is necessary at first to support it and to relieve it of weight-bearing. This can be done by the simple method of carrying the weight through a ring, which fits closely around the top of the thigh, on to two lateral uprights of steel which end in a socket in the heel of the boot. Provided that the ring fits closely beneath the tuberosity of the ischium, which must rest upon it and that the lateral steels are made of such a length that the heel does not reach quite to the bottom of the boot, the whole of the body weight will be carried to the ground through the appliance.

The patient is first fitted with a pair of light boots and the boot of the injured side has a hole drilled obliquely through the heel of sufficient diameter to take the bars of the splint, usually about ⅜ inch. The obliquity of the tunnels should be such that the outer hole is one inch nearer to the toe than the inner. The heel and sole of the other boot are raised by whatever amount is necessary to equalise the two legs when the apparatus is in use. The splint is the ordinary Thomas knee splint, the ring of which must be a close fit, so that it rests firmly pressed against the

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tuberosity of the ischium. If the ring be too large it will pass over the tuberosity and press against the perineum, rendering weight-bearing impossible. The ring should be kept low on the inner side and on the outer it should rise to a level just over the top of the great trochanter. It should be well padded, especially at the back, where the tuberosity of the ischium rests upon it. The lower end of the splint is cut off and the last 1 inch of each side bar turned inwards at a right angle to fit into the ends of the tunnel in the heel of the boot. The point at which the ends of the side bars are turned over must be very carefully determined. The boot is put on and the splint is fitted and pressed home against the tuberosity of the ischium. With the laces loose, the boot is then partly drawn off, so that there is a ¼ inch clearance between the sole of the patient's heels and that of the boot. The points for turning over and cutting are then marked with a file on the side bars of the splint. The efficient functioning of the splint depends entirely on this clearance and it should be fitted in the rough with the greatest care, a trifling extra length being allowed, so that the splint can be altered later, if, as sometimes happens, the padding of the ring is rather soft and allows of some "settling." A type of splint is made with sliding bars to admit of lengthening, but this of course adds to the expense besides weakening the apparatus. It is only necessary in cases where the splint is to be worn for a long time by a growing child, as in the treatment of tuberculosis of the knee joint. A broad leather band behind the knee and another in front, in which a hole is cut exactly fitting the patella and fastened by straps secure the limb in the splint. A strap connecting the side bars just above the ankles and passing behind the leg prevents them from springing out of the sockets in the heel. It is sometimes necessary to cut away the leather of the boot at the back of the heel to prevent abrasion of the skin in walking. The slight obliquity at which the bars are placed in the heels throws the foot out a little and facilitates walking. In such a splint the patient can walk with ease and all weight is necessarily borne by the ischial tuberosity. The length of time during which the caliper should be worn is very variable. Four months from the date of injury is about the average which should be allowed to elapse in a case of fracture of the femur before full weight-bearing is permitted, but radiograms at regular intervals will enable the surgeon to determine the progress of consolidation; in cases where end-to-end apposition of transverse fractures is secured and in children this period may be considerably shortened.

Functional use of the limb is one of the best ways of assisting union, it improves the circulation and the nutrition of the muscles, ensures the removal of waste products and prevents the formation of adhesions in joints. In cases of delayed union in the bones of the lower limb its value is inestimable, cases which have been stationary for weeks will commence to form callus soon after starting to walk in a caliper splint. It is suitable for the later stages of treatment of any fracture of the femur from neck to condyles and for osteotomies at either end of the bone. It is equally suitable for fractures of the tibia or an apparatus based on the same principle may be constructed to take its bearing from the tibial condyles, in which case the bone carries a larger proportion of the weight than in the long models.

This splint may also be used to keep the knee straight in the extended position or to force it straight if it be flexed. By the application of suitable pads, straps and short Jones' malleable iron gutter splints, it may be utilised for the correction of backward luxation of the tibia, genu valgum or lateral deviation. Sir Robert Jones advocates its use in the ambulant treatment of tuberculosis of the knee joint. In the concluding stages of treatment the splint may be used to give lateral support to the limb without relieving it of weight-bearing, which is accomplished by shortening the side bars, so as to allow the heel to reach the sole of the boot.

Figs. 1 and 2 show front and back views of the splint applied to a case of separation of the

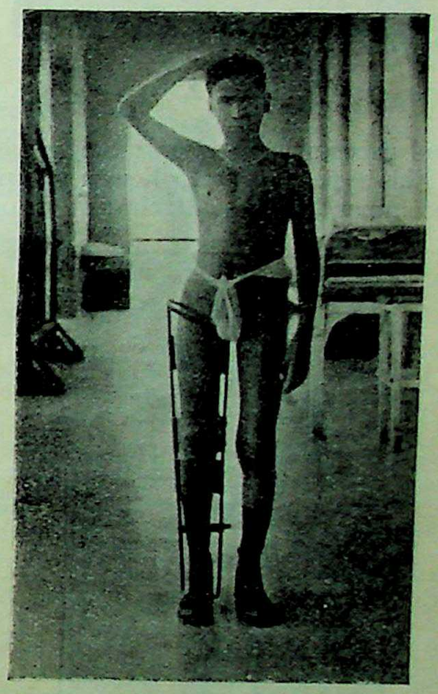

Fig. 1.

upper epiphysis of the femur after preliminary reduction and immobilisation in plaster of paris. The piece of leather at the back of the femur showed in the photograph is not necessary and is now omitted.

The necessity of fitting boots is a disadvantage when dealing with patients who are in the habit of going barefoot, and in whom boots are liable to produce pressure sores on the feet. Fig. 3 shows an attempt to dispense with their use. A Jones' extension anklet was fitted to the foot and attached by cords to the end of the splint, which

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was covered by rubber and on which the patient walked. A wood patten was placed on the sound foot to balance the length of splint requisite to take the extension. A strap over the shoulder

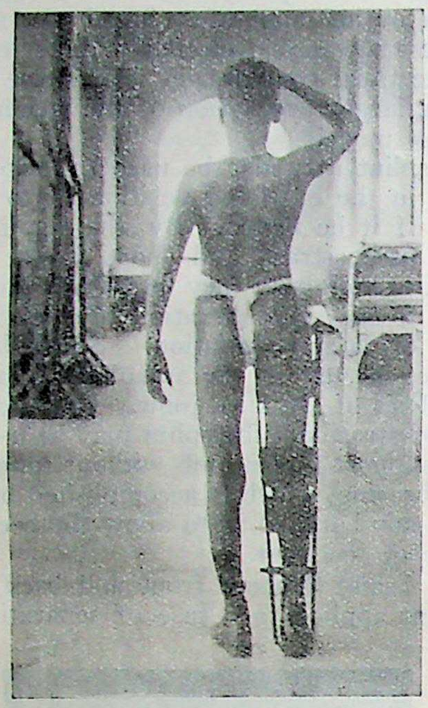

Fig. 2.

was found necessary to support the weight of the splint. This type of splint, though useful, is not to be recommended, the attachment is never so

Fig. 3.

firm as in the usual form and the patient has not the same freedom of locomotion. In practice it has been found that Indian patients readily adapt themselves to the use of the boot and soon learn to get about in the splint with only the aid of a stick.

The caliper splint was evolved during the Great War and widely used at Home. Its great utility in shortening the period of disability after fracture of the femur deserves to be more widely known in this country than it appears to be. By its use the patient is enabled to resume any occupation except hard manual labour about two months after his injury, a result which cannot be achieved by any other method of treatment.

PROLAPSUS UTERI: ITS ÆTIOLOGY, PREVENTION AND TREATMENT.

By LIEUT.-COL. V. B. GREEN-ARMYTAGE, M.D., F.R.C.P. (Lond.),

Professor of Gynæcology and Obstetrics, Medical College, Calcutta, and Surgeon to the Eden Hospital.

Prolapsus uteri, or hernia through the pelvic diaphragm, demands special consideration, particularly in regard to its prevention, for it has been reckoned that 70 per cent. of all multiparous women in India suffer in some degree from this condition.

In the Eden Hospital during the last five years 560 patients presented themselves at the Outdoor Department with either complete or partial procidentia, being 4.5 per cent. of the total gynæcological cases.

Of these, 245 consented to admission for operation. In every case the operation was by the vaginal route only, following closely the Manchester School technique. The complications and results of a great variety of operations, were as follows:—

	Total.	Cured.	Relieved.	Died.
B. coli in urine ..	80	80	..	..
Secondary hæmorrhage	20	18	..	2
Sloughing of the repaired area ..	2	..	2	..
Post-operative shock ..	10	8	..	2

Total Results.

Number.			Percentage.		
Cured.	Relieved.	Died.	Cured.	Relieved.	Died.
239	2	4	97.5%	.8%	1.7%

Prolapse may be regarded as the price paid by women for the assumption of the erect position, for as Ludovici reminds us, the mammalian female's rôle is probably younger and more lately evolved than the male's. To put it in a nutshell, whereas the male function has been the fertilisation of the female for say ten million years, the female has been erect, bringing forth her young alive, and suckling them for say two million years. Thus the male is probably the senior of the highest order of living creatures. A conclusion anticipated strangely enough by the account of the creation in the Book of Genesis!

Prolapse is very rarely seen in quadrupeds, or even in apes and monkeys, for in them the pelvis is a vertical ring, suspended from a dorsal sacrum, and the pelvic floor is made up of a broad bony ischio-pubic-symphysis, (*vide* figs. 1 and 2).

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In these figures it will be seen that the outlet occupies a vertical plane and is closed by a fibro-muscular diaphragm, which, being set at a right angle to the pelvic floor, escapes all strain.

The human female pelvis on the other hand, as woman acquired the erect posture, has evolved an inclination towards the horizontal, with the result that the pelvic outlet has rotated downwards and 45 degrees forwards, (*vide* fig. 3).

It will be observed that the pelvic floor is no longer composed of the strong bony ischio-pubic-symphysis of the quadruped, but instead is formed of a diaphragm of muscle and fascia, which has to withstand all variations of intra-abdominal pressure, and accommodate itself to the three canals which perforate it, namely the urethra, vagina and rectum.

Consequently it will be readily understood that the price that woman has paid during evolution for her erect position is:—

(1) A small and useless symphysis.

(2) A fibro-muscular pelvic floor, in place of a bony one.

(3) A new pelvic axis, which concentrates the forces of gravity and intra-abdominal pressure on the pelvic floor.

The question therefore arises, can the female pelvic floor withstand the "slings and arrows of outrageous fortune" imposed upon it? And the answer is "Yes," provided that:—

(1) There is no congenital weakness of its structure.

(2) There is no undue trauma to the supporting muscles and fascia at the time of delivery.

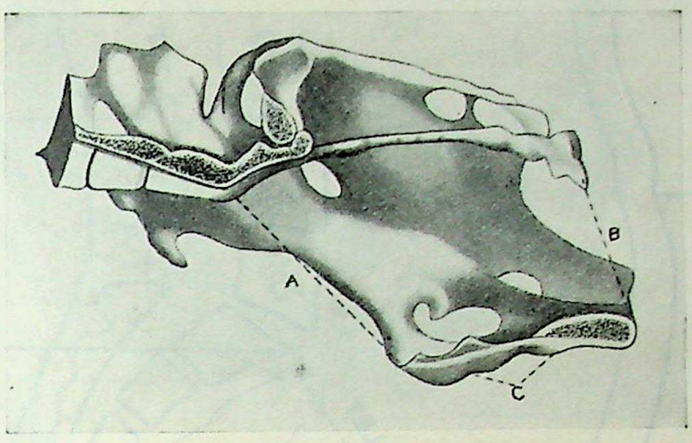

Fig. 1.—Diagram of the Mare's pelvic axis. (Saint-Cyr)
A, inlet, B, outlet, C, Ischio-Pubic Symphysis.

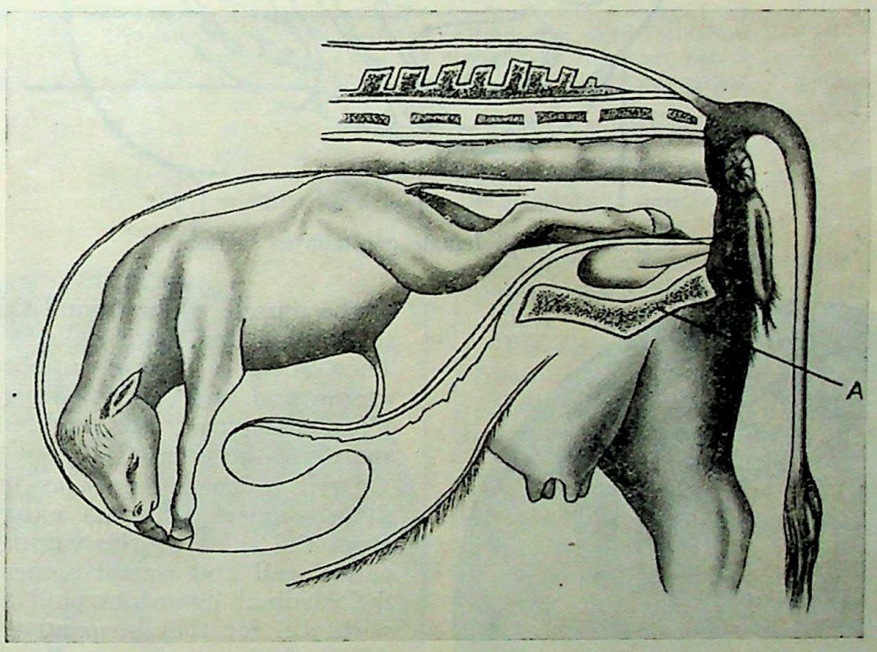

Fig. 2.—Lumbo-sacral position. (Saint-Cyr.).
A = ischio-pubic symphysis.

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(3) Normal tone and involution return to the pelvic structures after labour.

To understand this capacity, it is necessary to consider briefly the structure of the pelvic diaphragm, for the essential treatment of pelvic hernia depends upon a knowledge of anatomy, (*vide* figs. 4 and 5).

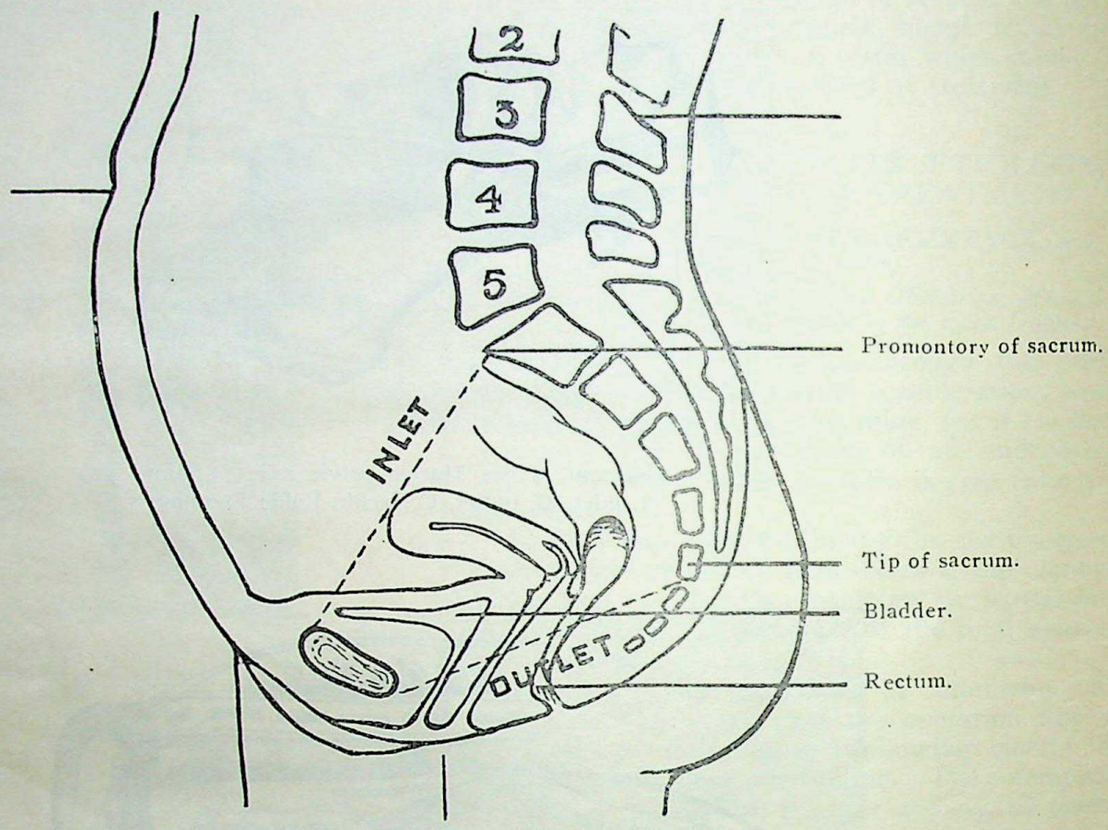

Fig. 3.—Normal female genitalia in section.

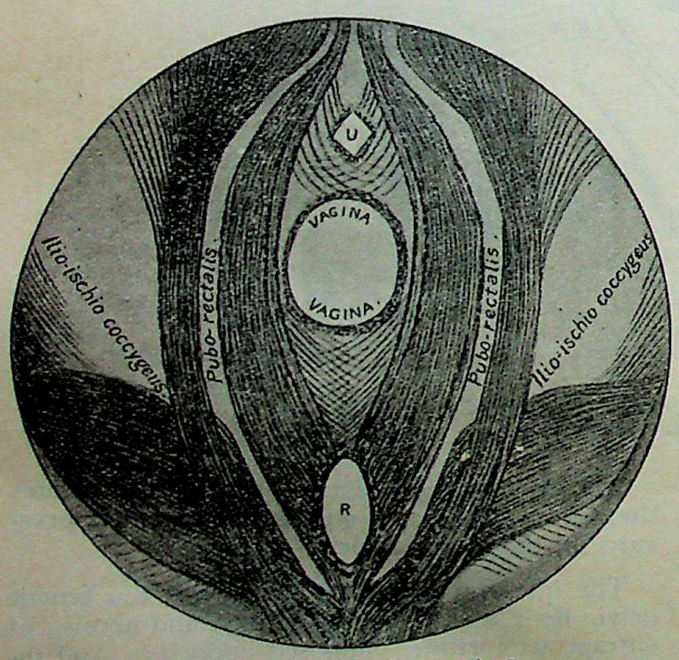

Fig. 4.—Muscles of the pelvic floor.

The above diagrams illustrate that the pelvic diaphragm consists of the two levator muscles, and the two coccygei, all of which are on the same plane. The two levator muscles descend from the front and sides of the pelvis on each side to the middle line, and reach to within half an inch of the hymen. Behind the anus, they are inserted into the strong ano-coccygeal raphe. But in front of this structure there is a gap, known as the genital hiatus, through which pass the urethra, vagina and anal canal. Those fibres of the muscle which bound this gap are thick and specialised and are called the pubo-rectalis. They form a strong supporting collar for the vagina and anal canal. It is these fibres which contract during coitus, and tend to grip the penis, and close the anus.

Deep to these muscles there are two fan-shaped musculo-fibrous expansions, which pass from the sides of the vagina and cervix to the pelvic wall and ischial spines. These are called the cardinal ligaments, and are of immense importance, for they suspend the uterus and upper third of the vagina to the lateral walls of the pelvis, and fill the base of the broad ligament. The unstriated muscle fibres of this expansion are continuous with the superficial longitudinal muscular layer of the uterus, and it is probable that they take an active part in the sexual orgasm of the female, as well as helping to dilate the cervix during labour. (Fig. 6).

The meshes of this fan-shaped structure contain special cells, which hypertrophy during pregnancy and are guardian cells against sepsis.

There are two other important musculo-fibrous structures, namely, the utero-sacral ligaments, which sling up the cervix to the bodies of the second and third sacral vertebræ, and suspend the

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uterus in a position of anteversion. In the erect position of women these ligaments are practically vertical. (Fig. 7).

Of lesser importance are two other specialised musculo-fibrous sheets, namely, the pubo-cervical, which join the cardinal ligaments across the middle

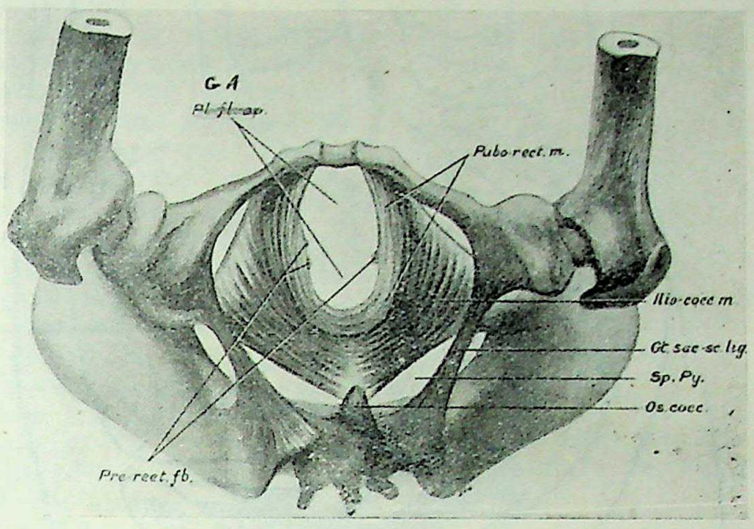

Fig. 5.—The levator ani: After Dickinson. (Reproduced from Garrigues.) After Paramore. The genital aperture (G. A.) is bigger than it should be from post-mortem changes. The cut ends of the pre-rectal fibres (Pre-rect. fb.) which pass into the perineum are shown; they are of negligible importance in man, because of the efficacy of the pubo-rectalis itself, which, arising from the pubes, passes *behind* the rectum, and with its fellow of the other side forms a sphincter for the pelvis, embracing with the pubic arch the three visceral canals.
Pl. fl. ap. = pelvic floor aperture.
Ilio-cocc. m. = the ilio-coccygeus muscle (the lateral part of the levator).
Pubo-rect. m. = the pubo-rectalis muscle (left).
Sp. Py. = space filled up by the pyriformis muscle.

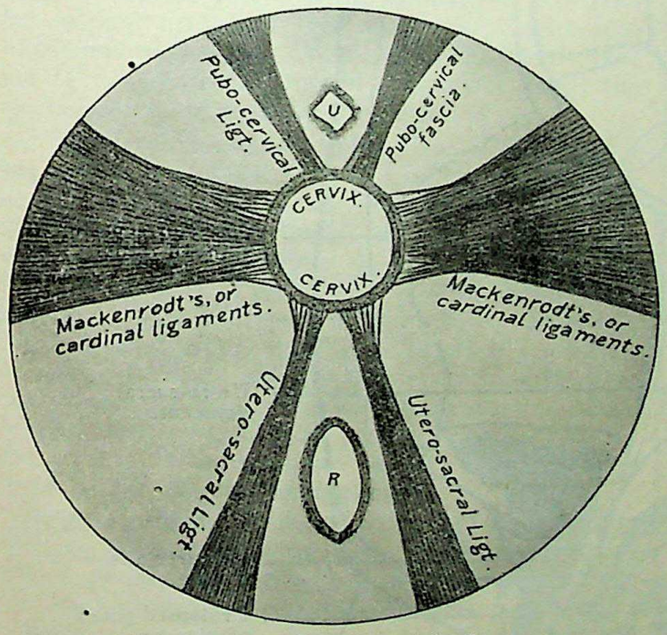

Fig. 6.—Fascia of the pelvic floor.

All these four musculo-fibrous ligaments have a supporting function. This can be easily demonstrated during a vaginal hysterectomy, for it is not until they have been cut that one can pull the uterus down into the vagina.

line, and act as connecting fibres between the pubo-rectalis muscles. Upon these the bladder rests.

Finally, we must consider that most important factor the intra-abdominal pressure, that is the pressure exerted upon the abdominal contents by the parietal muscles and thoracic diaphragm.

This pressure in the pelvis is variable, because the line of direct downward thrust of the thoracic diaphragm strikes the lower part of the abdominal wall (*vide* fig. 7) and thence is reflected backwards into the concavity of the sacrum at its lowest part. For instance, in the erect posture, the rectal pressure is 20 to 30 mm. of Hg. In the dorsal decubitus, it is 10 to 15 mm.; in the knee-chest position it is nil. But during, or because of any of the four C's—cough, confinement, constipation, or complication—these pressures may rise to over 100 mm. of Hg., that is roughly 3 lbs., to the square inch.

Now we have seen above that the weak spot of the pelvic diaphragm is the genital hiatus (*vide* fig. 5), roughly 1½ inches long by 1 inch broad. It is this aperture that has to withstand all variations of pressure, and under normal circumstances it is able to do so, for Nature has in addition superimposed the bladder and fundus uteri over this hiatus to act as a truss, and prevent extrusion of the viscera.

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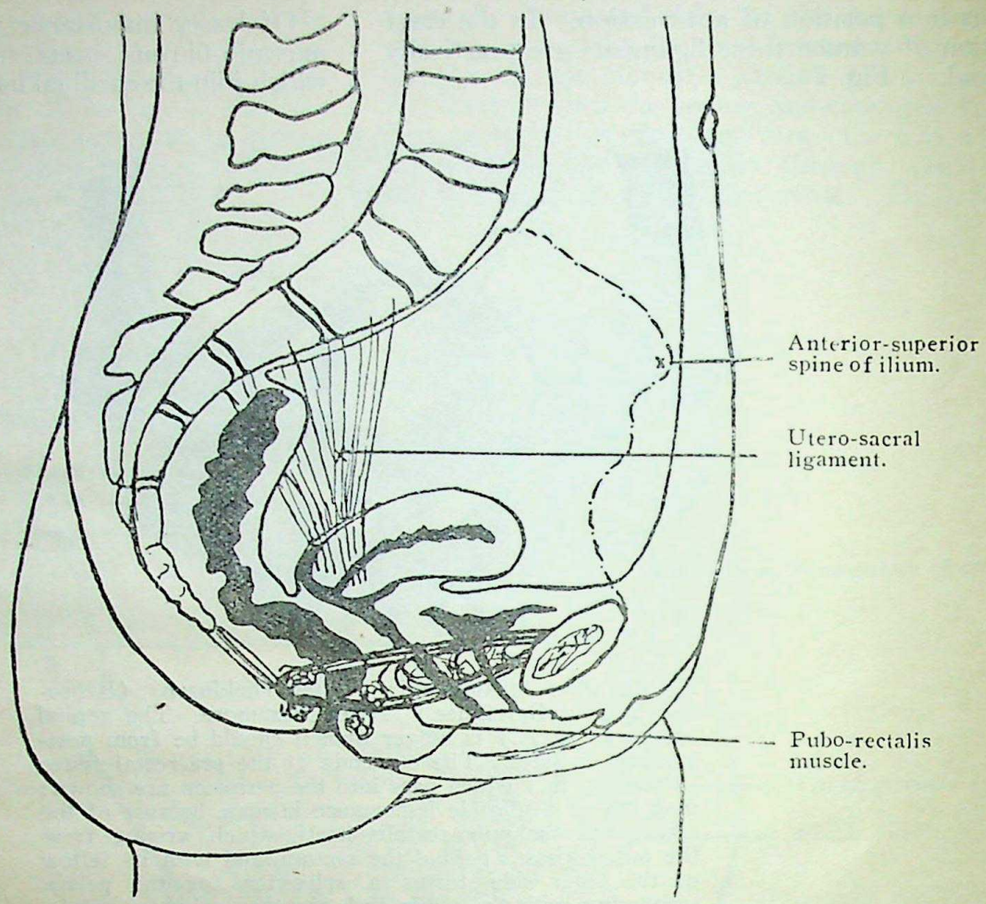

Fig. 7.—Sagittal section of normal pelvis. (After Robinson, *Clinical Journal.*)

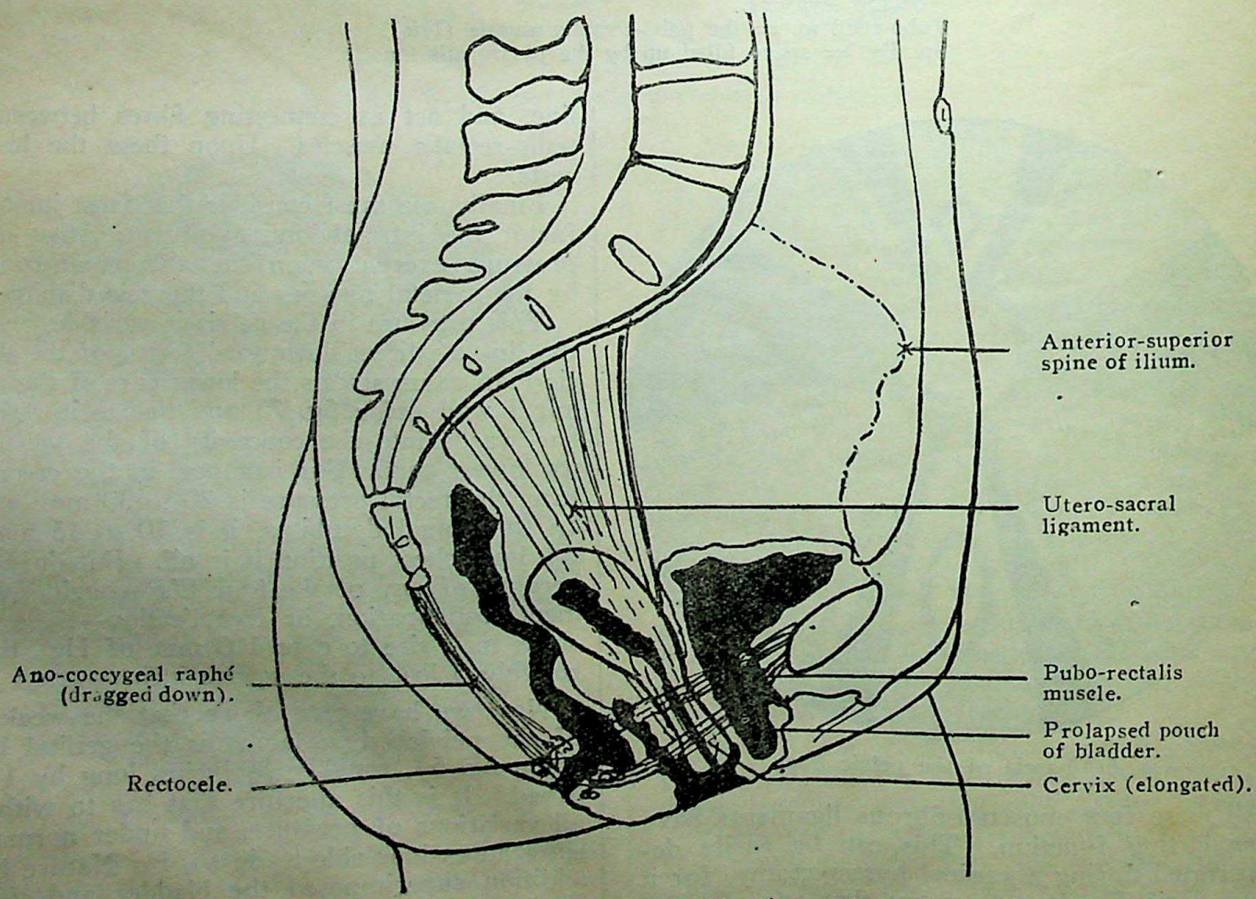

Fig. 8.—Sagittal section of pelvis, showing prolapse with rectocele. (After Robinson, *Clinical Journal*).

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But should this aperture be torn, stretched, or relaxed, through meddlesome midwifery, application of forceps before full dilatation of the cervix, pituitrin, or subinvolution, etc., the hole may enlarge to a size of 3 inches by 2, with the result that the pressure upon it becomes four times as great, that is 12 lbs. altogether.

The sequence of events being first that the bladder begins to sag, stretching the anterior vaginal wall to form a cystocele. This pulls upon the anterior lip of the cervix, causing retroversion of the uterus, which in its turn tends to descend as a cone through the genital aperture, if the cardinal ligaments are slack.

Such descent, as a rule continues, and there then occurs a pull from the posterior vaginal wall, with the result that the pouch of Douglas descends lower and lower, and the cervix is now visible at the vulva (*vide* fig. 8).

As a result of the continuous abdominal pressure and dragging of the bladder a complete procidentia eventually may occur.

Sometimes a cystocele and rectocele are present together without any descent of the uterus itself, although there may be a great elongation of the cervix. This is because the cardinal ligaments are intact, and do not permit of the uterus descending. At other times there may be a rectocele alone, and this may pull down the cervix, but rarely does it cause any descent of the uterus.

A rectocele comes about as a result of firm adhesion of the rectum to the posterior vaginal wall after septic infection, or of an unsutured large tear of the perineum. In such a case the anterior levator fibres being unable to constrict the vaginal orifice, a free space is present into which the rectum can bulge, with the result that the fæcal mass is forced forward over the sphincter ani, instead of through it.

I venture to think that these facts, though not new, are not without interest, when one remembers that Hippocrates, the Father of Medicine, 2,400 years ago described a case of procidentia, which he saw "hanging down like a scrotum between the legs of a woman." And that Paulus Ægineta, 1,600 years ago tells us that "Prolapse is occasioned when the ligaments are ruptured, or by the tearing away of the secundines in difficult labour, or by the awkward performance of embryotomy, or owing to paralysis and atony of the parts—which happens most especially to those in the decline of health."

The treatment recommended by both these ancients could hardly be bettered in any Indian village to-day, for they tell us "to empty the bladder and rectum, place the patient in a supine position, with thighs bent and legs separated. Then take a hasp of wool, in figure and thickness resembling the female vagina, dip it in the juice of acacia, and apply it to the prolapsed uterus, and project the whole mass upwards gently until it is completely restored. After which the vulva is covered with a piece of sponge squeezed out of oxycrate or pomegranate, and the legs are crossed and bound together."

In another place they obviously speak of complete inversion of the uterus, for it is written, "if the prolapsed uterus cannot be reduced, and should mortify in the course of time, we may take it away without apprehending any danger, for the whole uterus, having become mortified, has been taken away, and yet the woman lived."

Celsus, circa 15 A.D., recommended hip baths of salt and local applications of a styptic nature after the womb had been replaced.

Aretaus and Soranus, circa 150 A.D., both explain how prolapse occurs, due to relaxation of the muscles, or rupture of the ligaments supporting the uterus.

Alsaharavius the Arabian, circa 1080 A.D., directs us when attempts at reduction fail, or prolapse recurs, to extirpate the womb by an operation.

It may be of interest to note here that nowhere can I find any reference to pessaries of any kind being used by the ancients, nor is prolapse mentioned in the Susruta or Bhagabat.

Symptoms.—There is a good deal of analogy between flat-foot and prolapse, for both are dependent upon strains of the supporting apparatus. In the early stages of pes-planus, the pain is felt in the arches of the foot, but as the ligaments progressively give way the pain is complained of in the leg, due to the strain on the muscles and tendons which now have to support the arches. In the final stages of flat-foot, when the arches have completely fallen in, the pain entirely disappears.

Similarly, in prolapse of the uterus in the early stages there is complaint of a bearing-down feeling as if "the inside was coming outside." There are dragging pains in the groin and backache due to stretching of the fasciæ, muscles, and ligaments. Then a time comes when the patient often complains of flatulence, dyspepsia, heartburn, pseudo-angina or epigastric uneasiness, symptoms due to stretching of the mesentery, atony and general dropping of the intestine into the pelvis. The procidentia, being only part or parcel of that, is primary or secondary to the enteroptosis.

This can be diagnosed without any *x*-ray photograph by observing the pendulous hypogastrium of these patients when stripped. Such enteroptosis, with its symptoms secondary to prolapse, is often treated for years by physicians without avail, until the patient at last drifts into the hands of a gynæcologist, and is cured by operation.

In the last stage of complete procidentia, beyond discomfort of the mass which hangs down like a scrotum, there is no pain. Bladder and rectal symptoms in all the stages are present in a variable degree.

Treatment.—Considering that the great majority of cases of prolapse are associated with errors before, during, or after confinement, it

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will be agreed that the proper treatment of prolapse primarily should be preventative.

It behoves us, therefore, to consider such measures of prevention seriatim, for just as eclampsia and vesico-vaginal fistula are becoming more and more rare in the West, owing to efficient antenatal care, so undoubtedly a time must come (now that we understand its causes and statics) when prolapse will seldom be seen, or will be regarded as a stigma of bad midwifery.

It is particularly upon this aspect of prevention that I wish to lay stress.

(1) The abdominal muscle tone must be maintained by regular exercise, but should the tone be poor and the wall flabby, remember that a thin abdominal wall means a thin uterine and a thin cardiac wall, with the resulting effect of inertia, and its complications (Cf. the death of Rachel, *Genesis,* Chap. 35, Verse 16, and the death of the wife of Phineas, I. *Samuel,* Chap. 4, Verse 19).

Much can be done in the form of Swedish exercises, massage, diet, Parrish's food, and cod-liver oil, for the flabby abdominal wall, (*vide* the writer's article in the *Medical Annual,* 1927, and *Indian Medical Gazette,* February, 1927).

Smith, Stanistreet and Co., put up an excellent vitamine A, B, C, D preparation called nutrient C. S.

(2) Antenatal supervision from the 36th week, with special reference to the relation of the child's head to the pelvic brim and outlet, is imperative; for induction of labour or Cæsarian section are preferable to a long dry labour, terminating in great injury to the mother or child—the result of undiagnosed or unforeseen disparity between the head of the fœtus and pelvis.

(3) The position of the child's back, especially with regard to the avoidance of a posterior position, must be determined, for such is a fruitful source of long labour and laceration. It will be found that an early application of Buist pads is useful.

(4) Nurses particularly should be warned against permitting the patient to bear down during the first stages of labour, for this is one of the commonest errors, giving rise to stretching and subinvolution of the pelvic diaphragm.

(5) High forceps, or any application of forceps, or cranioclast before the maximum circumference of the child's head has passed through the cervix, must be regarded as a crime. Also pituitrin as "medical forceps" is responsible for much damage.

(6) Prophylactic forceps, or what is sometimes called "forceps control" should be used when the head has passed through the cervix and has rotated; for it should be remembered, if the fœtal head is too long delayed on the distending pelvic floor, there will be great stretching of the pelvic fascia, with resulting relaxation of the anterior and posterior vaginal walls, which afterwards sag. In such cases, the writer advocates that forceps should be used with due deference to the fœtal heart sounds, namely progressively slowing, and that a median episiotomy should always be done. If however the pelvic outlet is relatively contracted, he considers that a mediolateral incision is best.

(7) Sepsis at all times should be guarded against, and all lacerations should be accurately and anatomically repaired. Should there have been much manipulation, it is advisable to inject intramuscularly 2 to 3 c.c. of nucleic acid (P. D. and Co.), or even 30 c.c. of anti-streptococcic serum prophylactically.

Remember that cervical lacerations are frequently the outward and visible signs of inward and invisible tearing of the pelvic diaphragm.

(8) During the puerperium, it is essential that uterine and vaginal drainage should be assisted by posture; that is the head of the bed should be elevated and the woman encouraged to lie in the right or left Sim's position for some hours daily (*vide* fig. 9). By this posture, if

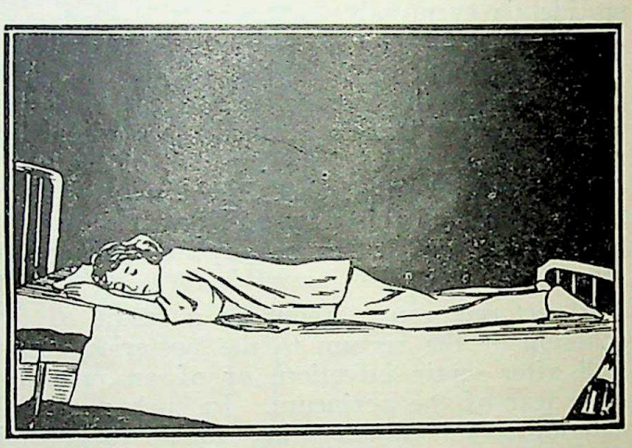

Fig. 9.—Head of bed raised. Lying on face.

the uterus is properly retracted, the vagina is kept free of lochia, and the downward drainage prevents multiplication, and upward migration of organisms, ever present in the vagina, with the result that the cervix no longer rests in a cesspool of stagnant lochia and bacteria.

(9) The intra-abdominal pressure and muscular tone of the parietal muscles may be revived by means of suitable exercises. The following simple diagrams illustrating neck, arm, leg, and breathing exercises, will I trust be prescribed by doctors and nurses in India. There can be no doubt of their value, or of the *bien-être* achieved by them.

Dr. Polak of Brooklyn, in addition to these exercises, advocates that all patients should do monkey-trot exercises, with a view to increasing abdominal pelvic tone, and anteverting the uterus.

(10) One of the most frequent complaints after a big child or difficult labour, is that of the relaxed vaginal outlet, which Howard Kelly so skilfully depicts. In this condition, although there may be no actual rupture of the perineum, there is such relaxation of the levator ani and sphincter vaginæ, that the whole outlet

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gapes, and the supporting buttress of the perineal body sags. The patient has no vaginal grip, and complaint is made that coitus is now uninteresting. For such cases, the Stacey-Wilson exercise is admirably suited. The procedure is for the patient, sitting or lying, to contract and tighten the anus every hour of the day, as if she

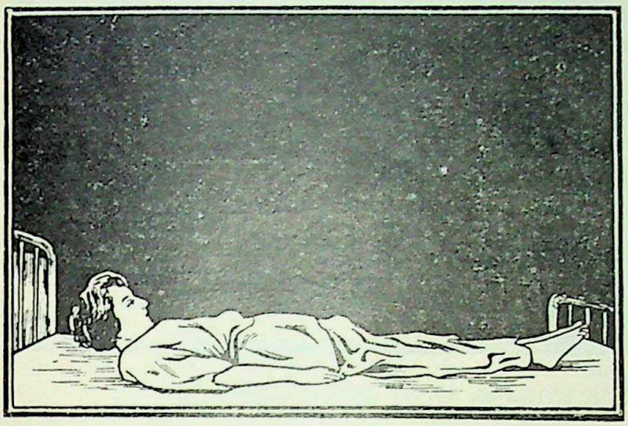

Fig. 10.—Neck raising, abdominal exercise.

were endeavouring to control a sudden attack of diarrhœa, and to maintain the contraction for as long as she can. The principle of this exercise is based upon the fact that when the sphincter and levator ani contract, there is at the same time, a lifting and contraction of the vaginal vault and outlet, thereby re-establishing the superficial and deep pelvic muscle tone.

(11) It is by no means uncommon for the puerperal or subinvoluted uterus to drop backwards, giving rise to backache and a continuous

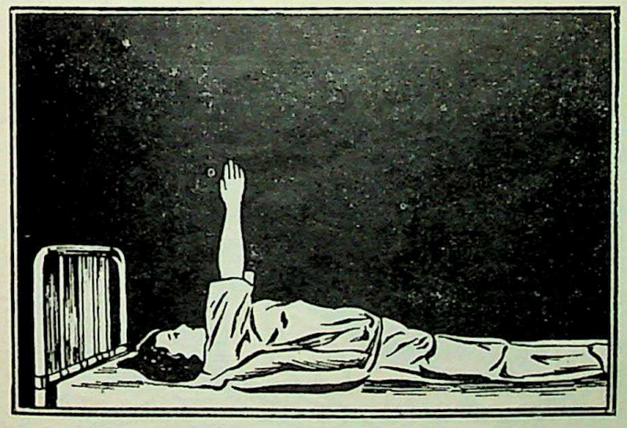

Fig. 11.—Deep breathing exercise.

lochial discharge. Such a condition merely demands replacement, and the temporary use of a ring pessary.

(12) It should be the invariable rule that every puerperal patient should be examined before leaving hospital, or the care of her practitioner, with a view to determining the size and position of the uterus; any error being noted and corrected.

Slackness in this matter is responsible for a great deal of suffering and gynæcological surgery.

Having dealt with the preventative measures, it remains to say a few words on the subject of pessaries—the most venerated, but yet the most abused weapon in the armamentarium of the general practitioner in the East.

Years ago, Sir John Bland Sutton remarked that the proper place for a pessary was behind the fire, by this meaning that gynæcologically the pessary was an anachronicism.

Practically speaking, there are only two conditions which justify its use.

(1) The ring pessary, used for retroversion of the gravid or puerperal uterus.

(2) Prolapse in an old woman, too debilitated to stand the risks of an operation.

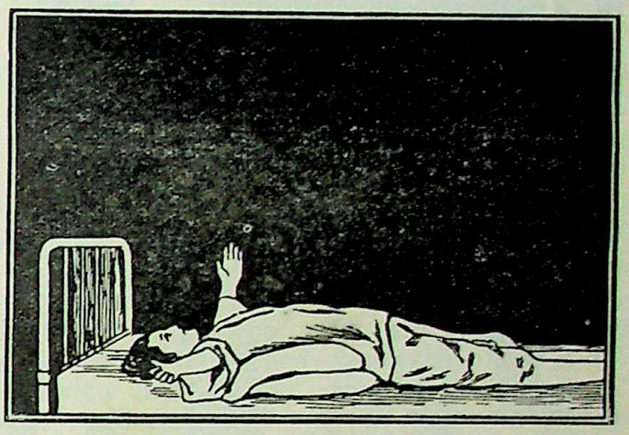

Fig. 12.—Deep breathing exercise.

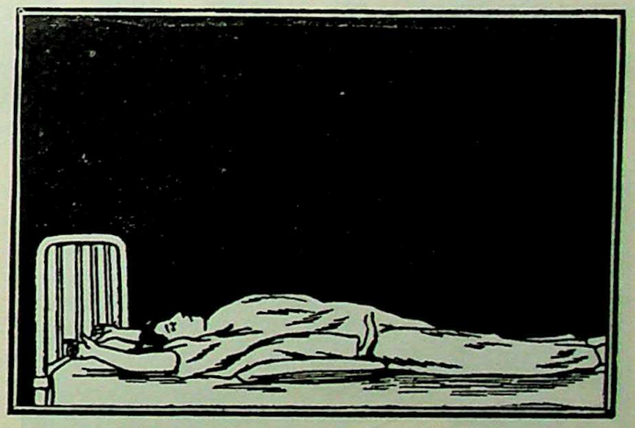

Fig. 13.—Diaphragm exercise to assist circulation.

Practitioners should bear these facts in mind, for this instrument is much abused in India. Moreover, they should remember that pessaries should not distend, but extend the vagina, and that they are merely trusses fitted to the size of the genital aperture. They do not cure prolapse, but allow it gradually to increase, and hence later make operation more severe.

If there be rectocele in an old woman, a ball or butterfly pessary may palliate, but such are dreadfully unhygienic.

It is a remarkable fact, and one that any chemist will corroborate, that whereas to-day inguinal trusses are very rarely prescribed, pessaries are sold by the gross. The reason for

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this must be either that their use is abused or that it is not realised that procidentia is curable by operation in 90 per cent. of cases, as are other anatomical herniæ; that is by the apposition or imbrication of muscles and deep fasciæ.

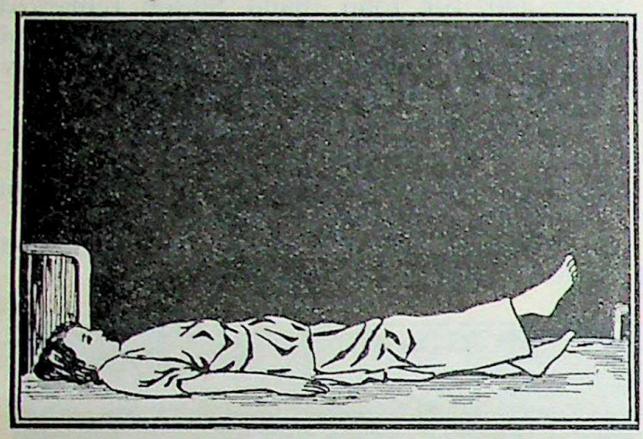

Fig. 14.—Leg and abdominal muscle exercise.

Operative Treatment.

Variety is the mother of enjoyment. Prolapse offers such, for there is scarcely any field in surgery which gives such scope for operative technique. Ninety per cent. cases can be cured. But I wish to reiterate that the treatment is by the vaginal route only, and that the operation of ventro-fixation for prolapse is unjustifiable and anatomically unsound, for the principle of all operations is to restore the pelvic floor to its former condition.

Only in cases of congenital prolapse, owing to almost complete absence of the pelvic diaphragm, are operative results disappointing. During the last two years, five of these cases have been under

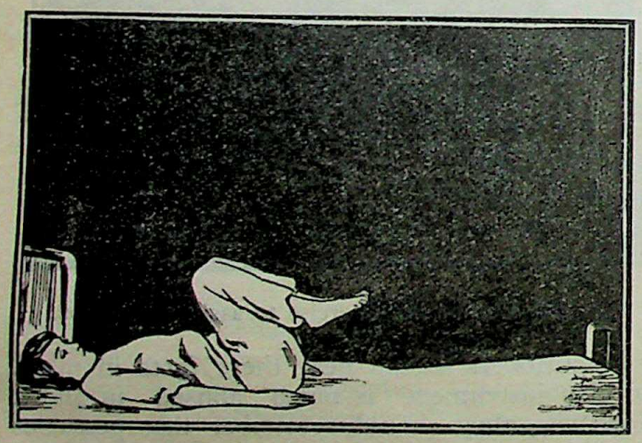

Fig. 15.—Leg and abdomen exercise.

my care, all under the age of twenty, and two of them married. Various plastic operations were carried out, but when seen eight months later, none of them could be called cured.

One most interesting hospital case in 1926 was that of an infant born in January, with complete procidentia.

In most cases several operations have to be performed at one sitting; for example first the uterus is dilated and curetted, then if there be cystocele alone, an anterior colporraphy is done —the bladder being pushed high up behind the symphysis from off the cervix, the edges of the vaginal wound, together with the underlying

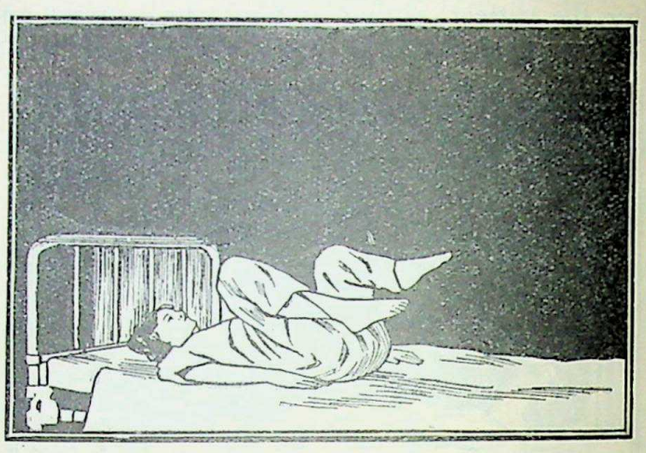

Fig. 16.—Thigh abduction exercise.

muscular tissue, are united by mattress sutures of catgut. A few single stitches are passed through the anterior wall of the cervix.

If the cervix be elongated, hypertrophied, or lacerated, it is amputated by a continuation of the anterior vaginal incision, in racquet form (the Fothergill operation). The two puborectalis muscles and the deep fascia of the cardinal ligaments are sewn in front of the cervix, whereas the edges of the racquet incision are sutured over the cut stump of the cervix.

In most cases a high posterior colporraphy and perineorraphy must also be done, the aim being to expose and appose the levatores ani in the middle line, using three layers of buried catgut.

Fig. 17.—Knee-chest posture; to relieve pelvic veins and antevert uterus.

In doing this part of the operation it is all important to "watch your step," that the vaginal orifice does not become so closed that later, coitus is impossible—a mistake that the junior gynæcologist is very apt to make, and one that only experience can obviate.

In India, where the majority of patients seeking hospital treatment are young multiparæ, with second or third degree prolapse, the writer

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particularly favours two operations; namely—the interposition operation of Watkins, and the Franck operation.

When doing the former, having opened the utero-vesical pouch he deliberately ligates both tubes with silk, before interposing the fundus of the uterus between the bladder and anterior vaginal wall. A posterior colpo-perineorraphy is done for the relaxed outlet at the same sitting. This operation is easy, and gives most excellent permanent results.

In the Frank operation for complete prolapse, the Fothergill technique as regards the anterior vaginal wall, bladder, and cervix, is followed. The pouch of Douglas is then opened. The cervix is amputated at the level of the utero-sacral ligaments, but before covering over the stump of the cervix (*vide supra*) the cut ends of the utero-sacral ligaments are sutured over the front of the cervix.

By this procedure, not only are these ligaments shortened, but they are made to sling the cervix high up, and into its normal position, thereby anteverting the uterus.

A posterior colpo-perineorraphy is done as before.

Any of the above combined operations should not occupy more than 45 minutes, for it must be remembered that many of these patients are old or debilitated. Complete hæmostasis is imperative. The operator will obtain great help by having a continuous stream of hot saline projected on the operation area by an assistant from a nozzle above the symphysis.

The le Fort operation or the Mayo hysterectomy operation was not performed in any case of this series.

In the statistics of the Eden Hospital, it will be seen that out of 245 cases, 2 patients died of secondary hæmorrhage, due to sloughing of the repaired area, and that 2 died of post-operative shock. To those conversant with the debilitated condition and poor physique of the Bengali and many Anglo-Indian patients, together with their small resistance to infection, due to malarial saturation, these figures will come as no surprise.

Minor secondary hæmorrhage (18 in this series) occurred about the 8th day and was as a rule due to giving way of the small descendens cervicis artery, or an artery in the perineum. An underpinning suture is all that is necessary in most cases.

Formerly the writer avoided post-operative vaginal douching, but of recent years, owing to the fact that climatic conditions tend to the growth of organisms and the accumulation of offensive discharges, he advocates antiseptic douches through a soft No. 12 catheter.

It is of interest to note that 32·6 per cent. of patients developed *Bacillus coli* infection in the urine. Whether this was *post hoc* or *propter hoc* cannot definitely be stated; for in the East, as I have previously shewn (*vide Medical Annual*, 1927) *B. coli* infections are extraordinarily common causes of morbidity. It is possible that a self-retaining catheter for the first week will reduce this liability. In fifteen recent operation cases for complete prolapse, in which this method has been used, there have been no bladder complications. In no case of the series did hydro-ureter, hydro-nephrosis or anuria occur—those rare complications first recorded by the late Mr. Fothergill. In none was the bladder or rectum injured.

Again I have to thank Captain B. K. Dutt, Registrar of the Eden Hospital, for his careful research of the case sheets, and I particularly wish to pay a tribute to the ward sisters and nurses of the institution, both in the European and Indian departments, for their zealous care both before and after operation—without which "the best laid schemes of mice and men gang aft agely."

I am much indebted to Mr. Susil K. Bhattacharya, artist to the Medical College Hospital for the pen and ink drawings Nos. 9—18 taken

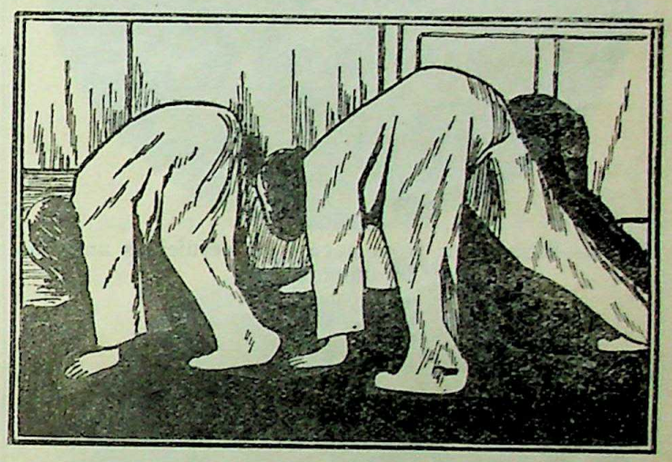

Fig. 18.—Monkey trot exercise.

from Dr. Polak's photographs in the *American Journal of Obstetrics and Gynæcology*, 1927.

Many of these exercises are very useful after abdominal operations, and are advocated by Mr. Lockhart Mummery for the prevention of post-operative thrombosis and embolism.

SOME ASPECTS OF THE PATHOLOGY OF PERNICIOUS ANÆMIA.*

By P. V. GHARPURE, M.D.,

From the Department of Pathology, Grant Medical College, Bombay.

WHILE putting before you the morbid conditions that have been observed at autopsies enabling us to diagnose post-mortem or confirm a clinical diagnosis of pernicious anæmia, it will not be out of place to give a short historical review of the views about the pathology of this affection.

* "Paper read before the Grant College Medical Society on the 29th March, 1927, accompanied by demonstrations of gross and microscope preparations."

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During the period 1822—1870, commencing with the first observation by Dr. Combe (1822), this affection was understood to be idiopathic, primary and essential, without symptoms during life, and without any lesions after death, but showing fatty degeneration of the heart, numerous but small internal hæmorrhages, and slight passive exudates. Changes in the bone-marrow were noticed at the time by Pye-Smith (1883) and Addison (1855).

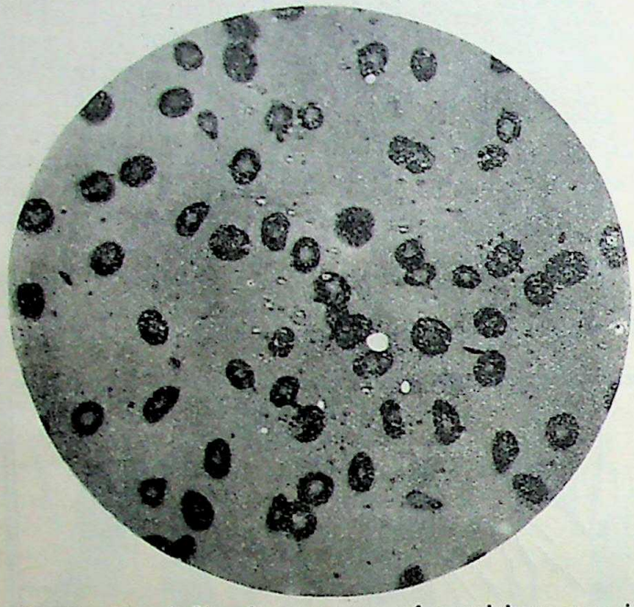

Fig. 1.—Blood film from a case of pernicious anæmia. (Oil immersion.)

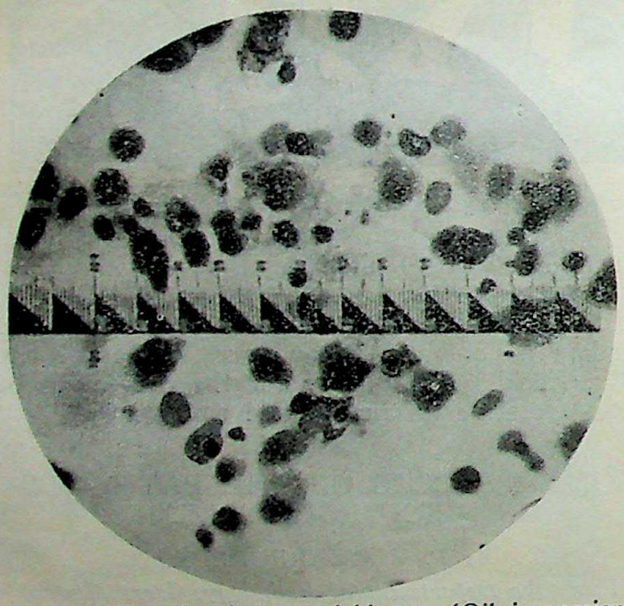

Fig. 2.—Film showing megaloblasts. (Oil immersion.)

During the next or second period, 1871—1888, it was understood to be a progressive pernicious anæmia, and later put down as a mere group of symptoms and not a disease, being a result of multiple causes. The anatomical changes were stated to be of no pathogenetic significance.

In the third period, 1888—1900, Hunter described it to be of specific, hæmolytic nature, the three chief infective factors being (1) putrefactive, (2) septic, and (3) specific. Ehrlich in 1892, based his theory with that of others upon the myelogenous origin of Addison's anæmia, and termed it megaloblastic anæmia. Of further importance are a few recent observations in connection with oral sepsis and achlorhydria.

During the past few months we have had the opportunity of carrying out autopsies on seven cases of pernicious anæmia in nearly rapid succession, and we felt tempted to put them all together before you to-day. All the autopsies

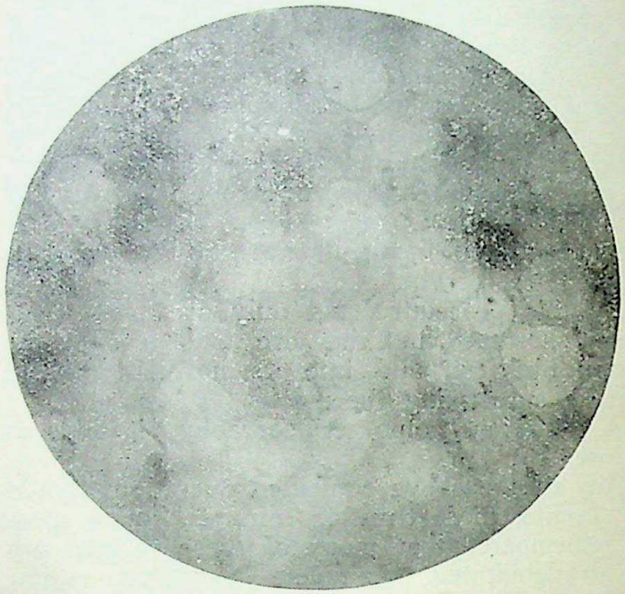

Fig. 3.—Normal bone-marrow from middle of femur. (1|6th inch. objective.)

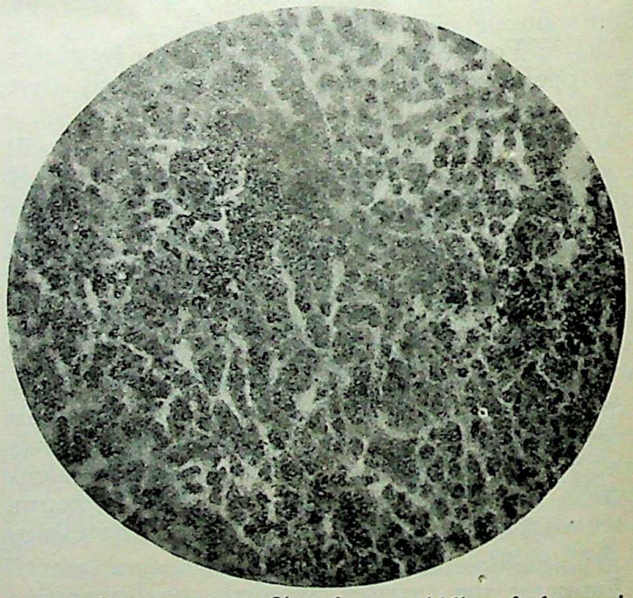

Fig. 4.—Bone-marrow film from middle of femur in pernicious anæmia. (1|6th inch. objective.)

were conducted by the writer and detailed methods of examination were employed in all cases. The bodies were obtained within a reasonable time, and in such a condition that post-mortem autolysis had not occurred to spoil the histology.

The following are short notes on these recent cases:—

P. M. 1. 1*st May*, 1926—Male, age 35. Admitted for diarrhœa of two months' duration. Clinical Diagnosis:—Tubercular diarrhœa; 15 days in hospital.

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P. M. findings:—Atheromatous aorta; œsophagus pale; bronchiectasis in the lung; fibrosed spleen; kidneys normal in appearance; liver firm; heart, chronic endocarditis of the mitral and tricuspid valves, smaller than normal; pericardium contained 6 ounces of fluid; intestines, complete absence of lymphoid nodules and Peyer's patches; bone-marrow, yellow marrow of the shaft of the femur changed into red, medullary cavity of the bone enlarged. Bone-marrow smears showed megaloblasts.

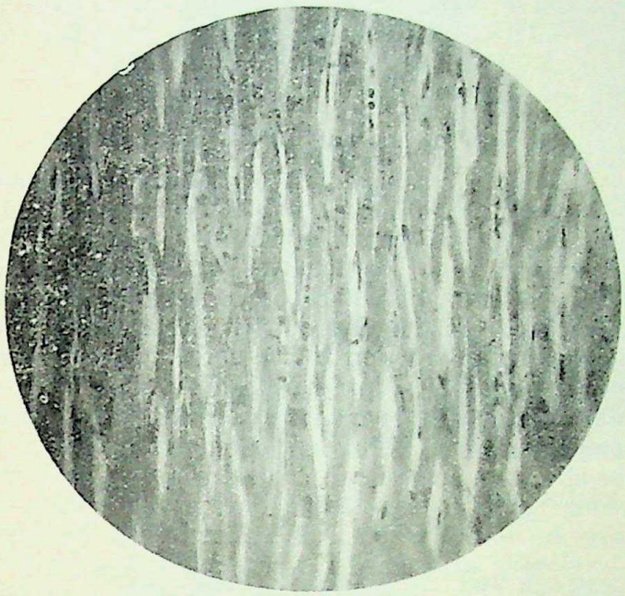

Fig. 5.—Fragmentation; "tabby-cat appearance" of heart muscle.

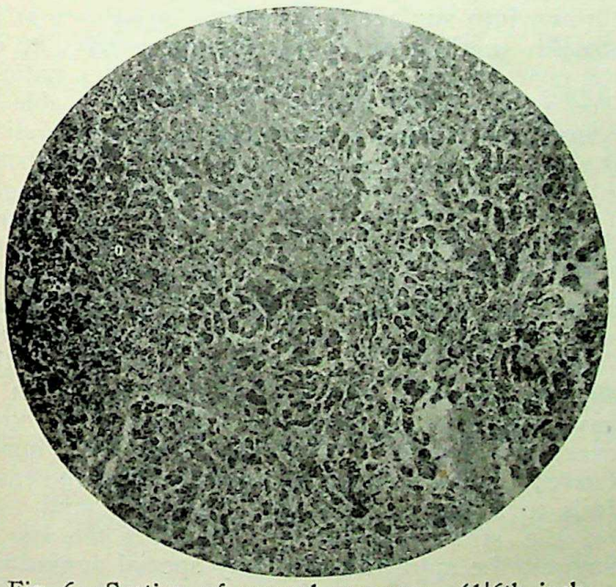

Fig. 6.—Section of normal pancreas. (1|6th inch. objective.)

P. M. 121. 10*th December*, 1926.—Male, age 26. Admitted for fever with rigors. Spleen not palpable. Pain in the abdomen. Blood and mucus in the stools for the last five days. Patient very anæmic. Blood:—No malarial parasites; poikilocytosis, few normoblasts and few megaloblasts. Heart dilated and galloping rhythm. Patient in the hospital for 4 days, had continuous temperature ranging from 102—104.

P. M. findings:—Heart markedly dilated right side. Liver fatty and enlarged. Kidneys, capsules of both adherent, right kidney parenchymatous nephritis. Spleen slightly larger than normal and perisplenitis present. Intestines showed a bacillary dysentery type of inflammation of the mucus membrane of the descending colon and sigmoid colon. Abdominal fat and organs tinged yellow. Bone-marrow from the femur changed into red.

P. M. 134. 29*th December*, 1926.—Male, age 25. History of fever with rigors, shortness of breath, œdema of both extremities for the last three weeks. Severe anæmia. Spleen not felt. Liver enlarged. Blood: No malarial parasites; poikilocytosis, anisocytosis, and polychromatophilia present. Hb. 25 per cent. Clinical diagnosis:—Chronic malaria and severe anæmia. Patient in hospital one day.

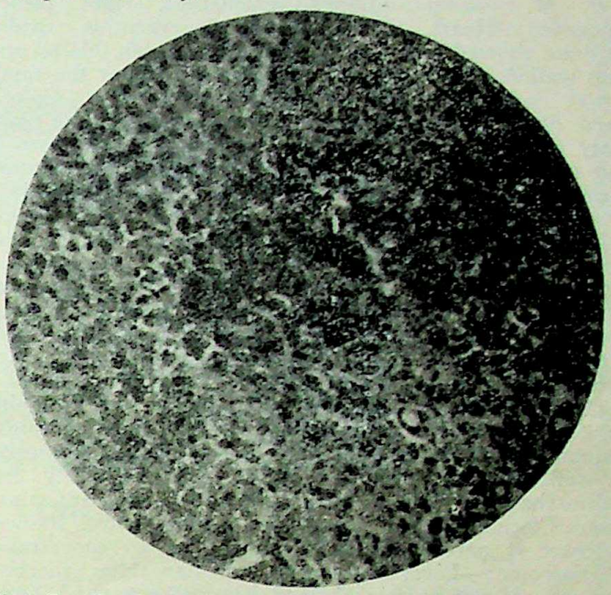

Fig. 7.—Section of pancreas in pernicious anæmia, showing hæmorrhagic patch. (1|6th inch. objective.)

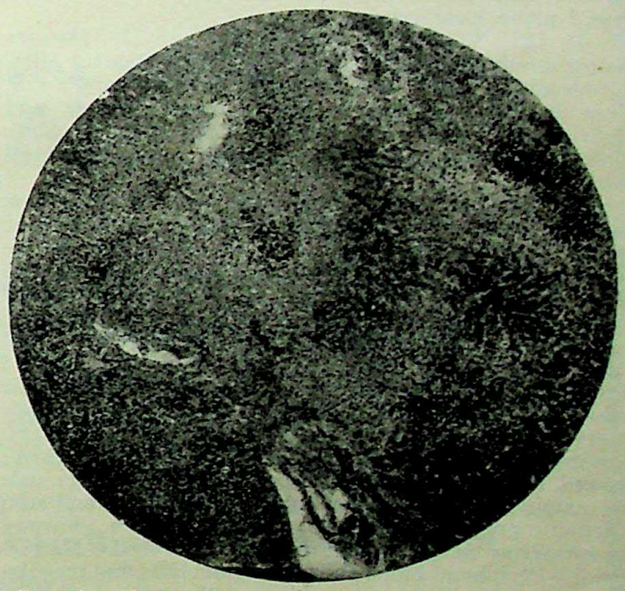

Fig. 8.—Hæmorrhages in the liver. (2|3rd inch. objective.)

P. M. findings:—Lungs œdematous and serous fluid in the right pleural cavity, right parietal pleura adherent to the chest wall. Heart pale and fatty. Liver enlarged and fatty. Kidneys fatty and lobulated. Intestines pale, no ankylostoma. Spleen slightly enlarged. Bone-marrow from femur changed to red. Blood smears and bone-marrow smears showed normoblasts and megaloblasts.

P. M. 139. 13*th January*, 1927.—Male, age 20. Pain during deglutition. Intermittent fever for last one month, cough. Spleen and liver normal. Patient in the hospital for three days.

P. M. findings:—Aorta stained with bile. Œsophagus, stomach, small intestine and cæcum showed sub-mucous hæmorrhages. Pleura adherent right side, sub-serous

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hæmorrhages left side. Heart:—Petechiæ of sub-serous hæmorrhages outside and under the endocaridum. Spleen soft. Liver soft and fatty. Kidneys enlarged and fatty. Bone-marrow red in the middle of the femur and smears showed normoblasts. A young stout subject with yellowish staining of the skin; large amount of subcutaneous fat present which was stained yellow.

P. M. 147. *26th January*, 1927. Male, age 30. History of malarial cachexia. Broncho-pneumonia. Patient in the hospital 7 days.

P. M. findings:—Lungs œdematous, right pleura thickened. Heart, marked fatty degeneration, endocardium showed tabby-cat striation. Stomach dilated and thin walled. Intestines:—Small ulcers all over the small bowel and cæcum. Liver enlarged and fatty. Spleen hard, fibrosed, and perisplenitis present. Kidneys: right fatty and left parenchymatous nephritis. Bone-marrow red in the middle of the femur. Blood smears showed normoblasts and megaloblasts. Microscopically liver showed fatty degeneration and infiltration and hæmosiderin. Kidneys fatty and left kidney showed chronic parenchymatous nephritis.

P. M. 154. *23rd February*, 1927.—Male age 26. History of diarrhœa for two months. Patient emaciated. Lungs: moist sounds at the apices. Pulse thready. Anæmia. Clinical diagnosis:—Chronic diarrhœa and tuberculous patient. In the hospital 3 days.

P. M. findings:—Tongue pale, pigmented, follicles hypertrophied. Pericardium showed petechial hæmorrhages. Heart large and fatty and papillary muscle showed tabby-cat striation. Liver pale and fatty and hæmorrhages. Kidneys both pale and fatty. Intestines pale. Cæcum bilobed and stenosed, large bowel showed stenosis at parts and ulcers on the mucus membrane. Microscopic:—Liver fatty and Prussian blue reaction present. Heart muscle showed hæmorrhages and fatty degeneration; papillary muscles showed fatty degeneration and fragmentation of the muscle cells. Pancreas showed acute hæmorrhages.

P. M. 162. *9th March*, 1927.—Male, age 25. History of slow continuous fever for two months. Painful piles, not bleeding. Skin and conjunctiva pale and with yellowish tinge. Heart, hæmic murmurs. Liver and spleen normal. No œdema. Seven days in the hospital. Clinical diagnosis:—Secondary anæmia, malaria and piles.

P. M. findings:—Well built, apparently stout young adult male with no signs of wasting, and with a history of irregular pyrexia. General colour of the surface of the body jaundiced; the sclera and conjunctiva tinged with bile. On opening the body a fairly large quantity of fat seen in the subcutaneous and extra-peritoneal tissues and the mediastinum. All the subcutaneous tissue stained with bile. Heart flabby, fatty, and left side larger; mitral valve and left auricle showed signs of chronic endocarditis; small hæmorrhages over the pulmonary artery; pericardium contained 5 ounces of non-inflammatory fluid. Endocardium over the papillary muscles showed tabby-cat striation. Aorta normal. Lungs pale and emphysematous. Liver enlarged and fatty and iron reaction present. Kidneys fatty. Spleen fibrous. Bone-marrow in the middle of the femur red. Microscopic:—Peripheral blood showed normoblasts and megaloblasts; bone-marrow smears showed the same.

From the above notes it will be seen that the majority of the cases reveal at autopsy an unmistakable picture, made up of lesions which vary in individual cases in degree only. Briefly enumerated they are as follows. The peripheral blood shows a few normoblasts, megaloblasts and anisocytosis. The bone-marrow shows overgrowth and megaloblastic reaction, whilst overgrowth absorbs the compact bone. The heart, the kidney and the liver show fatty changes. The spleen is fibrosed; the intestine pale and smooth; and small petechial hæmorrhages are seen in almost all the organs.

The various microscopical changes can be seen in the micro-photographs.

In three of the above cases, the patient was admitted with a complaint of diarrhœa which evidently has been the terminal symptom of this chronic affection. All the cases had slow irregular fever.

CAN THE NON-AGGLUTINATING VIBRIOS BE MUTATION FORMS OF THE CHOLERA VIBRIO?

By B. B. BRAHMACHARI, D.P.H.,
Assistant Director of Public Health, Bengal.

THE *Vibrio choleræ* closely resembles, in morphological, cultural and bionomical characters, the host of vibrios that are met with commonly in nature, in water as well as in human fæces. The characteristic which enables us to differentiate it from its saprophytic relatives is its agglutination reaction to the sera of convalescent patients and of animals immunised with it. But now it is well-known that even this characteristic may not always be of help; it has been found to be absent in some of the colonies grown from the same agglutinating strain (Minervin, 1924); it may be absent when first isolated from the stool, developing afterwards in sub-cultures; it may be removed by growing the bacteria in water (Stamm, 1914). Captain Maitra (1926), found that the vibrios rapidly lose the reaction when thrown into surface tanks either in culture or in stools. In these cases, the loss or weakening of the characteristic may be of a temporary nature. The agglutinating vibrios which we were able to convert into non-agglutinating ones by passing through water regained the reaction after repeated sub-cultures on ordinary nutrient agar (pH 7.6). Then, again, it has been found that such *Vibrio choleræ* as has lost or been deprived of its agglutination reaction produces in a rabbit, immunised with it, the agglutinin which is specific to the unaltered *Vibrio choleræ* (Stamm, 1914). But even the production of the agglutinin in the immunised animal is known to have been affected (Puntoni, 1913). Here, however, the change is quantitative and not qualitative; the anti-serum produced in such cases fails to agglutinate the specific vibrio, and acts on the strain producing it, at titres too low to suggest the appearance of any special agglutinin. Obviously the loss of reaction to the specific agglutinin does not involve any material change in the constitution of the vibrio; the part of it concerned in the change, viz., the agglutinogen, is simply weakened to a greater or less degree. But the change wrought by nature may be much more profound than what has been possible by laboratory methods; it may carry the change further, so that the immune serum produced by the altered vibrio is not only inert to the typical *Vibrio choleræ*, but agglutinates actively at a high titre the strain which produced it and presumably other cholera vibrios similarly altered,

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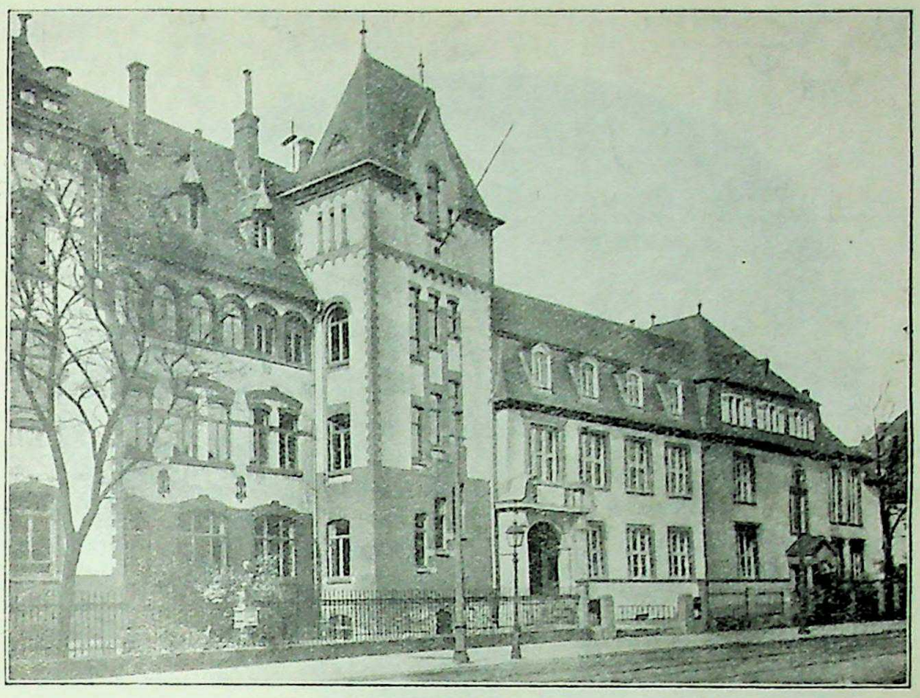

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these variants thus behaving like species distinct from the cholera vibrio. Japan appears to have made some headway in the research in this direction, Yamanouchi (1921) deprived the *Vibrio choleræ* of its agglutination reaction by growing it in the specific immune serum; and restored the reaction by growing the altered strain in the immune serum produced by the altered strain itself.

We have been working on this problem of mutation for some time; the investigation is still in progress, but, as the matter is so important, we venture to publish the results we have already obtained.

(*ii*) *Non-agglutinating vibrios.*—We have been studying 68 strains of such vibrios for about a year. On isolation they all failed totally to agglutinate with the cholera immune serum, the titre limit of the serum being 1 : 8000. By immunising rabbits with nine of them we got eight anti-sera distinct from each other as well as from the standard cholera anti-serum, the titre of seven of them was 1 : 8000, and of the remaining one, 1 : 4000. Thirty-four of the non-agglutinating vibrios fell into eight groups, the members of each group agglutinating at high titres with one of these sera and not with any of the other sera; four more reacted to sera of more than one group, also at high titres. Two more, the anti-sera of which were produced recently, stood by themselves, agglutinating with the anti-sera at 1 : 1000 and 1 : 2000 respectively. Members of the seven groups so far as they could be examined produced in rabbits immunised with them the same homologous anti-serum. So far, these groups of non-agglutinating vibrios, therefore, acted as so many species, distinct from each other and from the standard *Vibrio choleræ*. The rest still remain to be classified.

(1) All these 68 vibrios continued non-agglutinating to the standard cholera anti-serum for about seven months. After that, 37 of them *began to develop response to the standard cholera anti-serum*, the titre of the reaction to which they reached being as follows:—

Source of the strain.	Total number under observation.	Number which have changed.	Titre of agglutination with standard cholera serum. (Limit 1:8000.)							
			1 : 4000	1 : 2000	1 : 1000	1 : 500	1 : 200	1 : 100	1 : 50	1 : 20
Clinical Cholera ..	28	21	1	3	8	3	2	..	..	4
Healthy persons ..	21	9	..	2	4	2	..	..	1	..
Water of surface tanks	19	10	1	..	1	..	1	..	2	5
TOTAL ..	68	40	2	5	13	5	3	..	3	9

Two of the strains, both isolated from stools of cases of cholera on the 28th August and 13th September, 1926, respectively, agglutinated on the 16th May, 1927 with the serum of a cholera patient at the titre of 1 : 20.

(2) The changed vibrios are still all agglutinating also with their own homologous serum. We took Ch_{32}, a strain isolated from a case of clinical cholera on 27th September, 1926; as stated above, the anti-serum it produced acted on it alone, the titre rising after the usual four-weekly inoculations to only 1 : 2000. This serum was produced in the month of June last, i.e., 8 months after the isolation; in the meantime the strain has already developed a response to the standard cholera serum; the reaction, after continuing negative up to April, was first noticed to be positive on the 25th May when it had already reached a titre of 1 : 1000. The agglutinability to the standard serum then again went down, dropping to 1 : 200 on the 15th July, to 1 : 100 on the 22nd July and to 1 : 20 on the 16th August. On the 17th August we grew it in its auto-serum with the result that *the titre of its agglutination with the standard cholera serum went up to the extreme limit of* 1 : 8000 and after 6 sub-cultures every other day, examining 10 colonies after each sub-culture, the vibrio *has completely lost the reaction to its own serum.* We are going to immunise a rabbit with it to see if it will produce the standard cholera anti-serum, and also to grow the other non-agglutinating vibrios in their homologous sera to see if thereby we can make them lose their response to these sera and gain the reaction to the standard serum to high titres.

(3) The strain W_2 isolated from water of a surface tank on the 8th August, 1926, agglutinated with the sera of three groups at 1 : 1000, 1 : 3000 and 1 : 2000 respectively, the titres of the sera being 1 : 8000, 1 : 8000 and 1 : 4000, respectively. It was noticed just to agglutinate with the standard cholera serum on the 11th July of the current year, i.e., 11 months after the isolation; the titre of the reaction was then only 1 : 100, but it rose to 1 : 1000 by the 22nd August. Anti-serum was raised to it and collected after the third-weekly inoculation on the 23rd August, i.e., 12 months after the isolation of the strain. It *agglutinated the standard* Vibrio cholerœ *at* 1 : 1000; on the producing strain it acted only at 1 : 200; on the strain being grown in the standard cholera anti-serum, the titre to its own anti-serum rose to 1 : 500 on the first occasion, but on the second, it dropped to only 1 : 20.

The strain C_3, isolated from the stool of a healthy person on the 12th August, 1926, agglutinated with the group serum at 1 : 8000. Response to the standard cholera serum appeared by the 29th June, 1927, i.e., 10 months after its isolation;

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the titre which was at first only 1 : 20 rose to 1 : 1000 by the 26th July. Anti-serum was produced by it in a rabbit and collected on the 23rd August, i.e. 12 months after its isolation; it acted on the strain at 1 : 1000 and also agglutinated the other members of the group, but none of the other non-agglutinating groups; but *it also agglutinated the standard* Vibrio cholerœ *at* 1 : 500.

The strain C_6, isolated from a healthy person on the 7th August, 1926, agglutinated with its group serum at 1 : 4000, the limit for the auto-strain of the serum being 1 : 8000. It is just showing reaction to the standard cholera serum, the titre being only 1 : 20 on the 21st August last. The anti-serum that is being produced in a rabbit has attained to a titre of 1 : 200 and is positive also to all the other members of the group; it is negative to the standard cholera vibrio and also to members of the other groups, excepting the strain Ch_{32}, altered by growth in its auto-serum and now agglutinating with the standard serum at the extreme titre of 1 : 8000. The serum of C_6 is negative to the Ch_{32} strain not grown in its auto-serum, but it is *acting on the strain altered by such treatment.*

The strain W_{16}, isolated from the water of a surface tank on the 23rd September, 1926, was found to *agglutinate with standard cholera serum* for the first time on the 1st July of this year, the titre being 1 : 2000. On the 9th August the titre of the agglutination had risen to 1 : 4000. The *anti-serum* produced by it in a rabbit and collected on the 23rd August *agglutinated the strain itself as well as standard vibrio both to the titre of* 1 : 2000.

(*iii*) *Agglutinating vibrios.*—We have been trying to convert the agglutinating vibrio, i.e., the typical cholera vibrio agglutinating with the standard anti-serum, (*a*) by passing it through water free from salt and containing 1 per cent. of peptone, (*b*) by growing it in the standard anti-serum, and (*c*) by passing through rabbits. We also hope to take up the enquiry of the action of the bacteriophage in this direction. By growing in salt free peptone water as well as in standard anti-serum, we have been able to remove the agglutination reaction to the serum, the vibrio continuing non-agglutinating on sub-cultures. We have not yet been able to test these changed vibrios by inoculating them into rabbits to see if they would produce any new agglutinins.

The results of our experiments on rabbits have so far been successful. We examined the stools of 13 rabbits and found them free from vibrios; we took one of these animals and examined it thrice in seven days for vibrios in its stools, and lastly for agglutinin in its blood and found both to be negative, the latter even in a dilution of 1 : 10. We selected a strain of standard *Vibrio cholerœ* agglutinating to the limit with the standard immune serum, 1 : 8000. We then proceeded to immunise this rabbit by intravenous injection of the selected strain and to recover vibrios from its stools and study them for the change. The procedure and the result obtained are shown in the following table.

Date.	Number in millions of standard *Vibrio cholerœ* inoculated.	Titre of agglutination of blood examined with standard *Vibrio cholerœ*.	Reaction of agglutination of vibrios recovered from stools with standard cholera anti-serum, 1 : 8000.
4-4-27 ..	100	..	Not examined.
11-4-27 ..	..	1|50	" "
13-4-27 ..	500	..	" "
20-4-27 ..	1000	1|200	" "
27-4-27 ..	..	1|8000	" "
29-4-27 ..	2000	..	" "
6-5-27 ..	..	1|16000	Strongly positive.
16-5-27 ..	..	..	Feebly positive.
18-5-27 ..	..	1|8000	Not examined.
24-5-27 ..	..	..	*Negative.*
25-5-27 ..	..	1|2000	Not examined.
1-6-27 ..	..	1|1000	*Negative.*
10-6-27 ..	..	1|1000	Not examined.
17-6-27 ..	..	1|1000	" "
21-6-27 ..	..	..	*Negative.*
23-6-27 ..	..	1|1000	Not examined.
24-6-27 ..	..	..	*Negative.*
28-6-27 ..	..	..	*No vibrios.*
6-7-27 ..	..	1|1000	Not examined.
1-8-27 ..	..	..	*No vibrios.*
9-8-27 ..	..	Nil	Not examined.

The vibrio recovered from the stools of the animal under immunisation continued strongly positive up till the agglutination titre of the blood reached its acme on the 6th May, 1927, at 1 : 16000 after the fourth injection. After that the vibrios isolated ceased to be agglutinable, and these non-agglutinating vibrios contained to be excreted from the 24th May to the 24th June, after which the stools became free from vibrios. The agglutinability of the blood serum, which in the meantime had dropped to 1 : 1000, continued at that strength to the 6th July after which it disappeared.

The altered vibrio (*a*) fails to agglutinate with the standard anti-serum, (*b*) it is also negative to all the group anti-sera of our laboratory; it did react to the anti-serum of our non-agglutinating vibrio Ch_1, but only at the titre of 1 : 200 while the titre limit of the anti-serum was 1 : 4000, (*c*) the anti-serum it produced in the rabbits which we immunised with it agglutinated this altered strain to the titre of 1 : 1000, but has no action on the original or any other unaltered standard cholera vibrio. Thus this altered cholera vibrio behaves like the non-agglutinating vibrios so often found in the stools of cholera convalescents.

IV. Conclusion.

Vibrios not agglutinating with the standard cholera immune serum are far more common than the agglutinating or typical *Vibrio cholerœ.*

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They are met with in cholera patients and convalescents, in healthy persons, and in the tanks resorted to by the people. They form groups, the members of which agglutinate with the anti-sera of their own groups at high titres and with no sera of any other group; they also all produce in animals the same group anti-sera. So in this respect, the groups behave as so many different species. But we find that in the course of time and under special treatment many of them have acquired agglutinability to the standard cholera serum; that some of them have lost their reaction to their own anti-sera and have become highly agglutinable with the cholera anti-sera; and that still others can produce also in animals the specific cholera agglutinin. Conversely, we also find that the typical cholera vibrio, by living in an animal immune to it, has lost its agglutinability and has produced in animals agglutinin which is agglutiniting it at a fairly high titre, but has no action on unaltered strains of the *Vibrio choleræ*. Having regard to the above facts, we may fairly conclude that a very large proportion of these non-agglutinating vibrios are but the agglutinable *Vibrio choleræ* so transformed by the environment through which they have passed, or in which they are sojourning.

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A Mirror of Hospital Practice.

MYCETOMA.

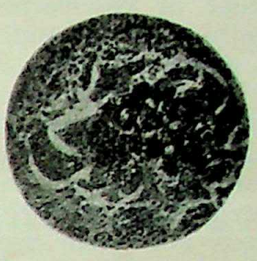
By E. W. C. BRADFIELD, M.S.,
LIEUT.-COL., I.M.S.,
and
A. VASUDEVAN, M.B. & B.S.,
Government Medical Hospital, Madras.

MYCETOMA causes very little pain until septic infection has occurred, and it is not often realised that the disease may remain encapsuled and stationary in the tissues for very many years.

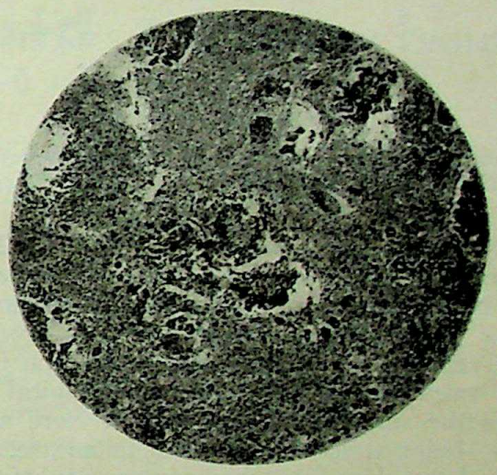
M.P., a Hindu cultivator was successfully treated at the General Hospital, Madras for a mycetoma of the right foot by excision of the great toe and metatarsal bone. While recovering he pointed out to us a small subcutaneous nodule above the right thumb and another similar nodule below the right malleolus. They were about the size of a pea, hard and freely movable in the subcutaneous tissue. The nodules were removed under local anæsthesia and contained black granules which culture proved to be mycetoma.

Although the disease is common and widely scattered over the whole of the Madras Presidency, it has no special endemic areas, a fact which probably explains why our knowledge of the disease has advanced so little since it was described two hundred years ago. The disease appears to us to be most common amongst cultivators whose fields lie adjacent to forests or scrub jungle, and to be inoculated from thorny bushes in which the fungus is living as a parasite, a mode of infection suggested by Manson.

Treatment of this disease is still very unsatisfactory. We have tried intravenous and direct injections of iodine, mercurochrome and other drugs without any success. These and other modern surgical methods all improve the my-



cetoma growth by eliminating sepsis, and often raise hopes of a cure which is never sustained. Deep *x*-ray therapy gave very hopeful results, for a time, but after prolonged treatment the growths remained stationary and cultures were



still positive. With our present knowledge, the only satisfactory procedure is early diagnosis and early treatment while the mycetoma is still small and mutilating operations unnecessary.

The life-history of the fungus and the influence of drugs upon its growth are subjects which urgently call for research, and enquiries into the topography of villages where the disease is known to have occurred would probably help the former.

NOTE BY DR. A. VASUDEVAN, M.B. & B.S.

The section shows a distinct fibrous capsule. The main mass of the tissue consists of spindle cells and large numbers of multinucleated giant cells of varying sizes, some of them reaching enormous dimensions. In the majority of the giant cells, the nuclei are collected in the centre, in a few at the periphery. Here and there, scattered throughout the section, are dark brown

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granular masses of varying sizes—surrounded by a zone of polymorphonuclear leucocytes. These have the appearance of mycetoma bodies, and consist of a number of spores held together by mycelial threads. The centre of this fungoid mass is less dense than the periphery, and here the individual hyphæ can be clearly made out, with a few leucocytes and debris. The periphery is irregular and dense and the spores are concentrated in this region, but no distinct clubs can be seen. Surrounding this mass is an area of polymorphonuclear leucocytes—in fact the picture is that of an abscess with the fungus in its middle. Outside the zone of polymorphonuclear leucocytes are large numbers of epithelioid cells and the giant cells described before, which are scattered over the section. The giant cells seen in sections of mycetoma are generally only few in number and have peripherally placed nuclei, i.e., "irritation giant cells" as seen in tubercle, but in this section they are very numerous, are of enormous dimensions and their nuclei are mostly placed centrally, not unlike myeloid giant cells. In fact, without the fungoid masses the picture is not unlike that of a myeloma. Cultures yielded a growth of the ordinary black variety of mycetoma.

A SHORT NOTE ON MILD SMALL-POX IN PATNA.

By JAHAR LAL DAS, D.P.H.,

Officiating Assistant Director of Public Health, South Circle, Bihar and Orissa, and Health Officer, New Capital, Patna.

EARLY in January of this year (1927) an outbreak of small-pox on a limited scale began in the New Capital of Patna and continued for about five months. Altogether fifty-five cases were reported to me, and on examination I found that twenty-eight of them were typical cases, while the remaining twenty-seven were atypical ones—being mild and modified in nature. Four of the latter, however, showed very doubtful signs and symptoms at the beginning, but their subsequent course left very little doubt as to their nature.

The initial symptoms in all these atypical cases were of a mild nature—the fever generally not going above 101°F. with slight pains in the body, except in about four cases where the patients complained hardly of any fever or pain. The majority of the cases were among children under ten. The distribution of the rash resembled very closely that of small-pox, and in several cases the numbers of eruptions were so few that they could be counted on one's finger tips.

The eruptions were of a papular nature to commence with and some of these developed a faint areola around them. No secondary rise of temperature was noticed when the pox began to ripen or acquire a pustular character, and the cases generally recovered in about 10 or 12 days.

It was also noticed that in a few families, where several members were affected either simultaneously, or at very short intervals, the intensity of the disease varied in degree, and at least one member in each family developed more or less well-marked symptoms of small-pox.

The point of interest in this outbreak is whether these twenty-seven atypical patients, who were protected by previous vaccination, should be regarded as having small-pox of mild and modified type and designated differently, e.g., alastrim, para-small-pox or variola minor, etc.

My object in writing this note is to lay before the profession what I observed in an outbreak of small-pox, and invite the opinion of those who have had experience of such cases. The principal point I would like to lay stress on is whether these mild cases were anything other than small-pox.

Editorial note.—Most medical men will regard these cases as mild small-pox, modified by previous vaccination.

THE PREVENTION OF INFECTION IN CATARACT OPERATIONS.

By G. JOSEPH GNANADIKAM, L.M.P.,

Swedish Mission Hospital, Tirupatur, Ramnad District, South India.

EVERY surgeon has his own favourite methods of reducing to the minimum the possibility of infection in cataract operations. The following is only an account of what is being successfully tried in the Swedish Mission Hospital, Tirupatur, under Dr. F. Keugelberg, M.D.

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Evening: Yellow Ointment (Ung. Hydrarg. Oxid. Flav. 2 per cent.)

2nd day, morning: Yellow Ointment.

Evening: Yellow ointment.

3rd day, morning: Yellow Ointment.

Evening: Zinc Sulph. and Ichthyol Ointment ($\frac{1}{2}$ per cent. each).

4th day, Operation.

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persistent discharge. Moreover, many of the patients who attend the hospital are not in a position to afford to stay for an extra month for the treatment of their trachoma. Except in one or two cases, trachoma has not influenced in any way the course of the healing. But, usually, there is a post-operative conjunctivitis, which is relieved by copper ointment 5 per cent. daily. On the day previous to the operation, the patient's eyelashes are trimmed and the eyebrows shaved, and he is admitted in the ward to prevent his exposing the eye outside.

As soon as the patient comes on the operation table (after the usual cocaine and adrenalin instillation) we give an injection of novocaine (novocaine, 2 per cent. solution, with 2 drops of adrenalin to each c.c. of it) around the eye, to paralyse the orbicularis oculi and the corrugator, and thus prevent the squeezing up of the eye. (Van Lint). It is quite a successful method, and the patient after about 15 to 20 minutes completely loses control of his squeezing muscles. The injection is given beneath the skin in the direction of the dotted line shown in the figure below.

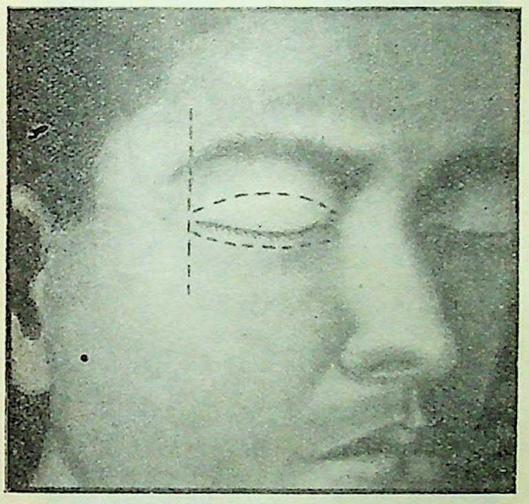


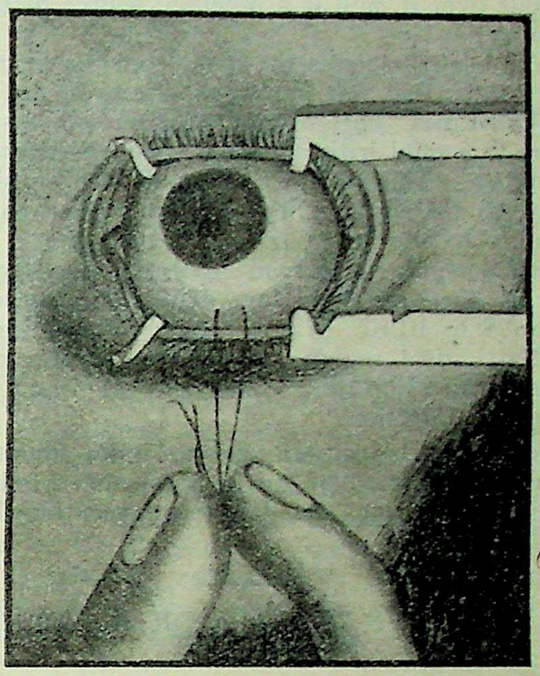
Fig. 1.—Showing the line of injection to paralyse the squeezing muscles of the eye.

We give about 1 c.c. of the novocaine solution in the vertical line, and about ½ c.c. in the lids. This is enough to produce the required result.

Just before the operation, a few drops of freshly prepared silvol (20 per cent.) are instilled, and the eye is thoroughly flushed with lukewarm saline, say about 8 ozs. The object of using the silvol is not so much for its antiseptic action, but for its property of staining any mucus present, which helps us to detect it easily.

The lid margins and the skin around are painted with tincture of iodine (1 per cent.).

After putting in the speculum, we ask the patient to look down, and grasp with a fixation forceps the tendon of the superior rectus (along with the conjunctiva) and pass a fine thread through the tendon with a sharp needle. This thread loop when stretched (see figure below) has the effect of pulling down the eye and also keeping it steady to some extent. This sort of "rein" not only keeps down the eye, thus obviating the necessity of constantly shouting to the patient to look down, but also prevents the eye from rolling up and bringing the wound in contact with the margin as well as the conjunctiva of the upper lid, which is not always sterile.



(upside down.)

Fig. 2.—Showing the loop in the sup. rectus tendon.

We irrigate the conjunctival sacs again. I may here state that the fluid that collects in the corners during the operation is now and then sucked off with a sterilized pipette. We thus clear off a good amount of fluid which may be a prospective source of infection, if it should ever chance to get into the chamber. Many advise external canthotomy to effect better drainage. We do it only in cases of deep-seated eyes with small palpebral fissures. This canthotomy also serves the purpose of removing any possibility of the knife coming in contact with the canthus during the incision.

We always finish up the incision with a small flap. The question of stitching up the wound is still under discussion. Though we have successfully tried it, we are fairly sure it is not worth while adopting it as a routine.

We do a preliminary iridectomy at a separate sitting only in cases where the eye does not get quite clean in spite of all treatment.

We always avoid irrigating the chamber, even if there be soft cortex remaining. A little device to express out the remaining soft cortex is as follows:—Press *very gently* on the bulb with the spatula, a little farther up from the wound, say, a little above the level of the insertion of the superior rectus, and you will see the vitreous pressing forward the soft cortex and

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stretching the cornea. With a few gentle strokes on the cornea, you can coax out the soft cortex. You invariably get a black pupil. This should be done with a very gentle hand.

One need not mention the dangers of a not well replaced iris.

Before bandaging the eye we take care to clear off any blood clot that may remain either on the wound or in the fornices. This blood clot forms a nucleus, so to say, for the collection of mucus over it, and is a potential source of infection.

We begin to dress the case from the next day after operation. It is always safe to do so.

Sometimes, but seldom now in our hospital, there is a mild iritis showing a somewhat muddy chamber. This is more often due to sensitiveness to the foreign lens protein, than to the trauma to the iris during the operation. It is rarely a regular infection. This muddiness clears during the next few days after an injection of about 8 to 10 c.c. of cow's milk intramuscularly in the gluteal region. Even what appear to be regular infection cases sometimes get round after this milk injection.

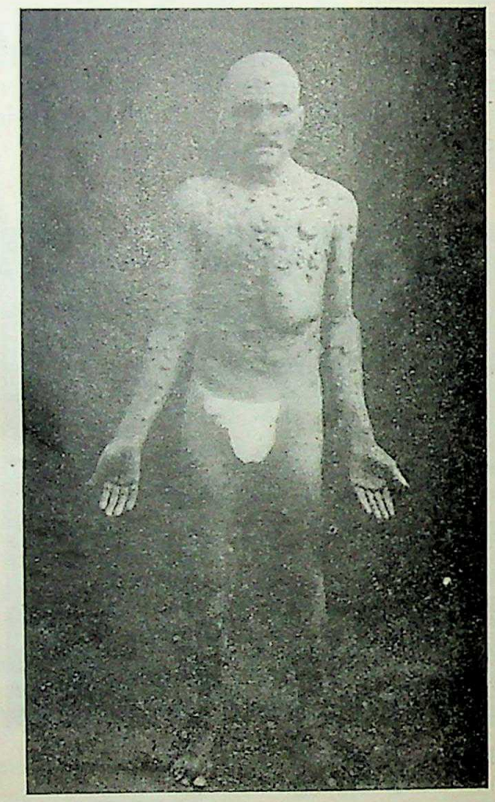
It would be superfluous to write about the usual sterilization of the instruments, eye-drops, dressings and etc., and I have not mentioned any of those details.

DERCUM'S DISEASE OR *ADIPOSIS DOLOROSA*.*

By D. J. ASANA, L.M. & S., F.C.P.S., B.M.S.,
Civil Surgeon, East Khandesh, Jalgaon.

THIS disease is so rare that it is quite natural that nothing much is known about its etiology and pathology, with no material at the disposal of the clinicians. In my 25 years' experience this is the second typical case I have seen. The appearance is so characteristic that I could not resist the temptation of having it photographed. I thought it justifiable to send it to press. Nothing definite is known about its etiology; the recent tendency is to attribute its causation to some deficiency of endocrine secretion. In this particular case the history is very interesting. The patient is a labourer at a railway station, fairly strong and sturdy. Up to 7 years of age there was nothing on his body. After that, he had some kind of fever for a short time, and after that, he began to observe small pimples developing on the surface of the body. His present condition the photographs show beautifully. The face, upper limbs, the abdomen, and the back show typical small tumours, painless, and soft to the touch. At two places, viz., on the chest and the back near the scapula, the tumours are somewhat large and on clinical examination they seem to be fatty and the skin can be pinched up all round the growth. On looking minutely many other small nodules show a somewhat bluish point on the top, indicating that there is possible obstruction to the sebaceous material from its gland.

Another peculiar point in the history of the patient, according to his statement, is that his grandfather and father had the same disease which started in a similar manner. There was no pain or tenderness on catching up these little tumours. His general health did not seem to have been affected. It was with great difficulty that he was brought to Jalgaon for his photograph to be taken.



Another case which I saw some years ago, was in a woman. The disease has been described by Dr. Dercum of New York and hence it is called 'Dercum's disease.' The books at my disposal do not throw any further light on its etiology, pathology and treatment. In an encyclopedia of medicine consulted there is only a small paragraph given to it. It states that it is characterised by the presence of diffuse localised collections of fat, especially in the limbs, and associated with marked pain in these parts. The hands, feet and face are usually free. It is more common in women than in men and it is probably due to some disturbance of the action of endocrine organs. It resembles, if it is not identical with panniculitis.

The latest edition of Thomson and Miles describes the disease as multiple subcutaneous

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*(*Note.*—We have shown the above notes and Dr. Asana's admirable photographs to Lieut.-Col. H. W. Acton, I.M.S., who considers that the condition illustrated is one of molluscum fibrosum. The familial history given is typical of this disease.—ED., *Indian Medical Gazette.*)

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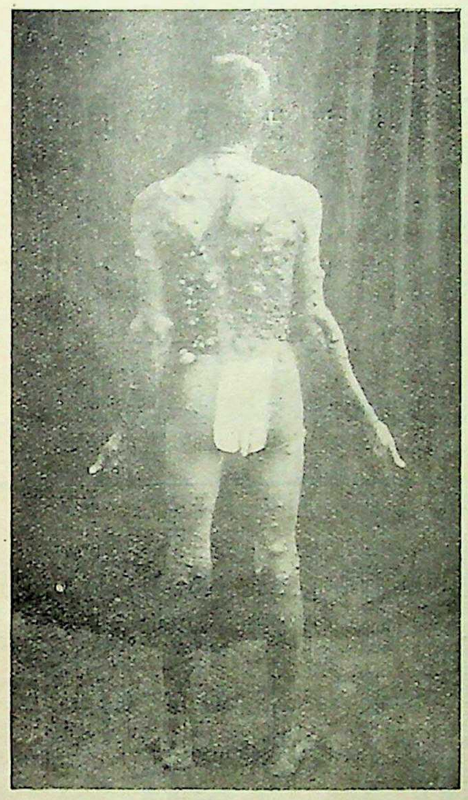
lipomata. They say that these multiple tumours show little or no tendency to increase in size, and the pain which attends the development does not persist. No treatment is suggested, except that if in some places there is a large growth causing disfigurement, it may be removed by operation.

Osler describes it as a disorder characterised by irregular symmetrical deposits of fatty masses on various parts of the body preceded or attended by pain, and associated sometimes with asthenia and physical changes. These small masses are diffuse and symmetrical, involving the abdomen, chest, arms, or legs. The face, hands and feet are usually spared. The pain is sometimes spontaneous and is easily excited by pressure. Asthenia is not always present, but may be a marked feature. The patients are



often irritable, and French writers have described cases with mental changes. Sometimes the skin over the areas of infiltration is markedly hyperæsthetic. The fat metabolism of the body is not yet fully understood. It appears to be under the control of the internal secretions. At puberty we see the deposition of fat, particularly in the skin. Following castration there is an increase in the subcutaneous fat. Eunuchs are as a rule stout. At the menopause increase in weight is common, and during pregnancy and lactation fat may be greatly increased. In only one point have we any positive knowledge as to the internal secretions controlling fat metabolism. In cases of tumours of the pituitary gland or in its neighbourhood marked general adiposity and sexual infantalism have been observed. It has been shown that the pituitary body controls carbohydrate metabolism, and the removal of its posterior lobe leads to great increase in body weight. There seems to be some relation to increased tolerance for carbohydrate with adiposity. It is not unlikely that many of the cases of extreme obesity in young persons are due to hypopituitarism. A remarkable phenomenon, associated with excessive fat, in young persons is an uncontrollable tendency to sleep like that of the fat boy in Pickwick.

SOME OBSERVATIONS ON THE VALUE OF IODINE IN TUBERCULOSIS.

By CH. KRISHNAMURTY, L.M.P.,

Sub-Assistant Surgeon, Central Jail, Rajahmundry, East Godaveri District.

WHILE previously attached to the tuberculosis annexe of the Central Jail, Bellary, I made an attempt to study the value of iodine in pulmonary tuberculosis with the permission of the Medical Superintendent.

There are forty beds in the annexe and patients from all parts of the Presidency are received for treatment under optimum conditions as Bellary is an elevated place with a dry climate. Treatment is carried out mainly on sanitarium lines. There are two blocks, positive and negative. All cases with tubercle bacilli in the sputum are placed in the positive block; and here also all cases with T.B. + + +, far advanced, or with low powers of resistance are kept in the ward proper, while less acute ones are placed in the verandahs. All patients with any fever are kept in bed. The usual routine of treatment consists in continuous inhalations according to the practice advocated by Dr. Muthu of the Mendip Hills sanitarium, a nourishing diet, taking care to see that each patient gets the requisite amount of organic calcium. Two pints of milk, one egg, four ounces of mutton and six ounces of vegetables are generally found sufficient to meet this. Pure cod liver oil, a teaspoonful thrice daily with calcium lactate 15 grs., is also given to make sure of a liberal supply of vitamine A and increase the calcium index to induce fibrosis. Graduated breathing exercises and heliotherapy are also enforced. Patients are encouraged to spend the morning hours generally between 7 and 10 A.M. in the sun, or under the shade of trees, with their bodies exposed to the ultra-violet rays of the sun to derive as much as possible of vitamine D. This is supplemented by injections of sodium morrhuate or iodine, or both.

Eight strongly positive cases with hectic temperature ranging between 101° and 102° F, sputum either + + or + + + to T.B., and with fairly advanced typical signs were given a course each of six intravenous iodine injections. The quantity given at each injection was half a grain of iodine with one grain of potassium iodide and distilled sterilized water 5 c. c. With the exception of one who had bad otitis media and mastoiditis the others were unaffected. This patient had a remarkable improvement, in that the inflammation had all resolved.

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Condition on Admission.					Condition on 15th June, 1927.				
Serial No.	Admission weight lbs.	Temperature.	T. B. in sputum.	Treatment.	Weight lbs.	Temperature.	T. B. in sputum.	Remarks.	
1	95	100.4°F.	+++	Alternate iodine and morrhuate.	105	N.	+	...	
2	74	100.4°F.	++	First a course of iodine, morrhuate afterwards.	83	N.	+	...	
3	95	99.8°F.	+	Iodine first, morrhuate later	104	N.	Nil	Tuberculous caries of rib and cervical glands.	
4	74	100°F.	+	Alternate morrhuate, and iodine.	82	N.	Nil	Tuberculous synovitis and ascites.	
5	114	99.4°F.	Nil	Iodine	117½	N.	Nil	Tuberculous caries of the spine.	
6	105	100°F.	++	Alternate iodine and morrhuate	105	99°F.	+	Discharged.	
7	97	100°F.	++	Alternate iodine and morrhuate	102	99°F.	++	Treatment incomplete; also has cervical gland inflamed, being tried on pure I. V. iodine.	
8	95	99 to 99.4°F.	++	First morrhuate, changed to alternate iodine and morrhuate.	91	99.4°F.	+++	Fresh foci.	
9	86	99°F.	+	Sod. morrhuate subcutaneous	90	N.	Nil	....	
10	90	N.	Nil	Do.	97	N.	Nil	....	
11	115	N.	Nil	I. V. Iodine	120	N.	Nil	Tuberculous arthritis in addition to pulmonary T. B.	
12	84	99°F.	Nil	Morrhuate first, later on iodine and morrhuate alternately.	84	99°F.	Nil	Frequent subject of malaria.	
13	..	N.	Nil	I. V. Iodine	..	N.	Nil	Tuberculous omentum.	
14	..	N.	Nil	Do.	..	N.	Nil	Lymphangitis in addition to pulmonary T. B.	Course of treatment incomplete.
15	..	101°F.	+	Do.	..	N.	+	....	

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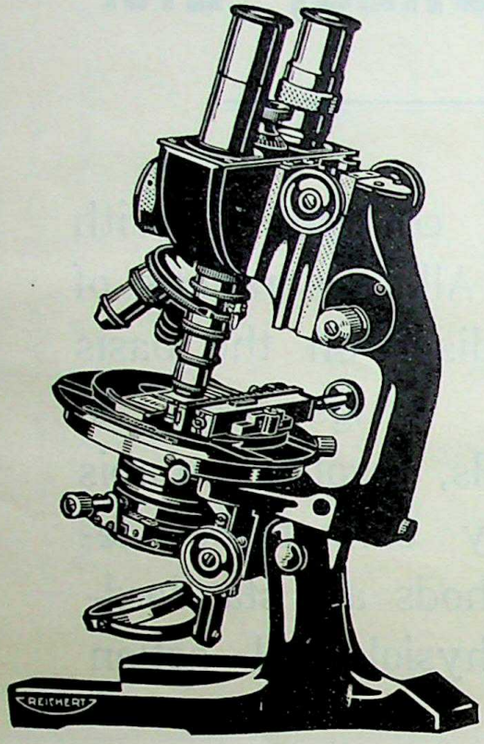

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I am certain that but for the intravenous iodine injections the case would have gone on to suppuration or even to meningitis and cerebral abscess. I may remark that his lung condition and the other symptoms were much the same as before.

Two advanced cases of patients who had had numerous intravenous injections before and whose veins were all collapsed or otherwise unsuitable were tried on nascent iodine orally for three weeks. There was no appreciable improvement in any of them.

Four cases with temperatures of below 100°F. in the evenings were tried with a course of intravenous iodine injections (Nos. 2, 3, 5 and 11). Every one of these improved markedly, as can be seen from the annexed table. Of these three (Nos. 3, 5 and 11) had each a surgical tuberculous affection—tuberculous periostitis, tuberculous arthritis and tuberculous caries of the spine respectively. They all cleared up very well.

Seven cases with evening temperatures below 100°F., and with no advanced disease, the sputum being + were treated with iodine and sodium morrhuate, the former intravenously and the latter subcutaneously. Their improvement was mostly satisfactory, as can be seen from the accompanying table (Nos. 1, 4, 6, 7, 8, 12, and 2 later).

Ten cases were tried on sodium morrhuate subcutaneously. These were all either apyrexial or with a low temperature of about 99°F., in the evenings and with no T. B. in the sputum. They were all given a course up to 4 c.c. of a 3 per cent. solution, commencing with ¼ c.c. and increasing by ¼ c.c. twice a week. All these showed marked improvement. All of them gained in weight, became apyrexial, and the physical signs showed marked attempts at fibrosis.

Conclusions.

(1) Iodine in any form is probably not of much use in advanced cases of pure pulmonary tuberculosis.

(2) It is of great value in early cases with a maximum temperature of about 100°F.

(3) It is of use in cases with temperatures between 99° and 100°F., when given alternately with sodium morrhuate.

(4) It is especially of value in cases of surgical tuberculous affections of bones, glands, joints peritoneum, etc. Whatever may be the general condition of the patient, iodine is of value in controlling this inflammatory process as was seen in a case reported in the beginning.

(5) Sodium morrhuate is of value in almost apyrexial cases and its value appears to be enhanced when alternated with iodine in early apyrexial cases. All cases treated with pure sodium morrhuate were omitted, and only a few have been given in the table for comparison. Similarly, advanced cases treated with iodine only referred to in the beginning have been left out of the table.

(6) Since writing the above, I have had occasion to try three more cases but their course of treatment was not complete when I left Bellary on transfer. One was a case of tuberculosis of the omentum. There was a distinct mass in the mid-line, freely movable, which rapidly yielded to intravenous injections of iodine. After five injections the mass became less than a third of its previous size, and tenderness and pain all disappeared. The second was a case in which there was an attack of chronic lymphangitis which also yielded to intravenous iodine. The third was a case of pulmonary tuberculosis with a temperature of 101°F., sputum positive. After a single intravenous injection of iodine the patient became gradually normal in temperature in about five days.

I have to thank Lieut. V. J. Lopez, I.M.D., Medical Superintendent, Central Jail, Bellary, for his kind permission to publish these notes.

A CASE OF CYSTIC PAPILLOMA ARISING FROM THE BROAD LIGAMENT.

By P. P. GOPALKRISHNA IYER,
Sub-Assistant Surgeon, Civil Hospital, Magwe.

MA PWA SHIN, aged 21 years, married, nullipara, was admitted to the Magwe Civil Hospital on 28th December, 1926, for the treatment of swelling of the abdomen of two years' duration. The patient stated that she had been tapped at a mofussil dispensary on two occasions and that large quantities of reddish coloured fluid had been removed each time. This treatment afforded her some temporary relief. She had also suffered from complete amenorrhœa during these two years. On admission, the abdomen was much distended with fluid, the flanks giving a dull note while the rest was tympanitic; a fluid thrill was also present. There was œdema of the lower extremities. The heart was displaced upwards, lungs, etc., normal. Vaginal examination disclosed a hard immovable tumour about the centre and left illiac fossa. The patient was tapped once more and a hard painless immovable tumour about the size of a fœtal head was found near the middle line and deep in the pelvis. A cystic tumour being diagnosed, operation was advised and at first refused. Subsequently the patient gave her consent and the operation was performed. The usual incision for an ovariotomy being made, a large cystic tumour was disclosed. In attempting very gently to free adhesions, and before any tapping could be done, the cyst wall was torn accidentally and a large quantity of straw-coloured fluid faintly tinged with blood escaped, a good deal of it invading the abdominal cavity, which it was not possible to avoid.

In addition to this, the inter-cystic matter consisted of tuberous masses of papillomata attached to the lower segment of the cyst wall. These masses were of a cauliflower-like appearance, were not particularly vascular, and weighed 2 lbs. 8 ozs. The cyst was unilateral and appeared to

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arise from the broad ligament. There was no pedicle.

The cyst wall was removed by blunt dissection and the bed of the tumour obliterated by a running stitch. In addition to the fluid contents of the cyst which escaped, a very large amount of ascitic fluid was also liberated. To meet this sudden fall of pressure, a hypodermic injection of strychnine and digitalin was administered in the course of the operation. The abdomen was closed in the usual manner and the patient made an uneventful recovery, the wound healing by first intention. She menstruated a week after operation and is now quite well.

A specimen of the growth was sent to the Pasteur Institute, Rangoon and proved to be a papillomatous cyst.

An interesting feature of the case was that in spite of the large quantity of intra-cystic fluid which escaped into the peritoneal cavity, no untoward results followed.

The operation was performed by my Civil Surgeon, Dr. C. A. Wells, I.M.D., to whom I am indebted for permission to publish these notes.

A CASE OF ABDOMINAL INJURY BY AN ARROW.

By J. M. GHOSH, M.B. (Cal.), D.P.H. (Lond.), D.T.M. & H. (Cantab.),
Sadar Hospital, Keonjhargarh, Balasore.

CHARAN MAHANTA, a Hindu male child aged 12 years, was admitted to hospital as a transfer case on the 5th June, 1927, having been brought a distance of 36 miles, partly by motor and partly being carried. He had been accidentally wounded in the abdomen by an arrow.

On admission, as there appeared to be no urgent symptoms, operation was deferred till the next day, and was carried out on the 6th June. On admission he was slightly jaundiced, the abdomen moving well—though a little distended; no fever; the tongue extremely coated and rather dry. After the arrow had struck him in the abdomen he had passed urine, but no stool. The pulse was normal and he complained of but very little pain. On removal of the dressings which had been applied, to our surprise we found that the whole of the arrow head, had passed into the abdomen and about 1½ inches of the shaft was protruding from the wound; the shaft had been cut short, and a part of the small intestine and omentum was also protruding. The point of entry was just external to McBurney's point.

At operation the wound was enlarged, and the whole of the arrow head and a part of the shaft about 4 inches in length, which had taken an inward, slightly forward, and downward direction, were found inside the peritoneal cavity. The point of the head lay free, but the two "ears" of the arrowhead were found embedded in coils of intestine. Operation was completed however without any resection of the gut being necessary, and a drainage tube was left in. In the evening after operation the temperature was 101.4°F.

On the 7th, jaundice was deeper and there was loss of bladder control. On the 8th, he passed three very bilious stools and there was an offensive discharge from the wound. He was put on to strychnine injections and an alkaline mixture, and a dose of two millions of a *Bacillus coli* vaccine (Calcutta Clinical Research Association's stock vaccine) was given on the 9th. By degrees the jaundice cleared. A dose of four million *B. coli* vaccine was given on the 12th, and a similar dose on the 15th. The patient eventually made a complete recovery and left hospital cured on the 11th July, 1927. Hydrogen peroxide and diluted chlorogen were the only lotions used in dressing the case.

Points of interest in the case were:

(1) The almost complete absence of any signs or symptoms of shock.

(2) The complete absence of pain.

(3) The incidence of jaundice, bladder and bowel trouble, but the rapid return of control over the sphincters.

(4) The good service rendered by the *B. coli* vaccine.

In conclusion, I have to thank Sub-Assistant Surgeon Sailindra Nath Ghoshal of the hospital for his care of the patient, and for these notes.

A CASE OF *BACILLUS COLI* INFECTION IN AN INFANT.

By K. V. THAKKAR, L.M. & S. (Bom.),
Chief Medical Officer, Idar State, Bombay Presidency.

THE following case shows how important it is to examine the urine in a case of irregular continued fever in a child.

An infant girl, aged 6 months, commenced having fever from 10th June, 1927. The fever was of an irregular remittent type, ranging usually between 99.5° to 102°F. Only once in the course of 15 days did it go up to 103.0°F. The pulse was between 100 to 128. Quinine made no impression on the course of the temperature, and the fever was put down as one of the paratyphoid group. There was, however, one very marked feature about the temperature, viz., frequent and marked ups and downs. In ten to twenty minutes, and without the aid of any diaphoretics the temperature would come down from 102° F. to 99.5°F. and then would again go up to 101.5°F. in half-an-hour. Having in mind the predominance of this feature about the temperature in a previous case of *B. coli* infection in a child aged 18 months, as verified by culture, I examined the child's urine in the present case, and found it turbid and markedly acid. On examining the centrifuged deposit under the microscope, large numbers of coliform bacilli and pus cells were found. The child was immediately put on to 5-grain doses of potassium citrate every 3 hours, and the temperature came down to normal in 36 hours on the 16th day of illness, the child making an uneventful recovery.

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Indian Medical Gazette.

NOVEMBER.

THE F. E. A. T. M. CONGRESS.

As it is unlikely that our issue for December 1927 will be out in time for the forthcoming Seventh Congress of the Far Eastern Association of Tropical Medicine, which is to meet in Calcutta from December 5th to 10th, 1927, we take this opportunity of extending a welcome to the many delegates and visitors from foreign lands who attend this Congress—a welcome which we trust the medical profession in India will translate into deeds, rather than words.

We need tell our guests nothing of the "glamour of the East," for they are Far Easterners themselves, and quite familiar with the tremendous interest and attraction which the countries of Asia exert on those from Western lands, whose lives are spent "East of Suez." There is something more than magnetic about the East: the "pagoda tree" yields smaller crops than formerly in these lands, but still the children of the West are content—and more than content—to give their lifetime, and sometimes their lives, in its service. And our visitors will find in India an amazing country; a mere railway journey across India will teach them that it is a sub-continent, and not a mere country, for, as day succeeds day in the journey, castes, peoples, creeds, scenery and colouring change like some vast kaleidoscopic picture. "Mother India" may be poverty-stricken, may be full of curable ills, but she *is* nevertheless *Mother India,* and none recognise it better than her adopted children of other lands. Thus there has grown up the great tradition of the Indian services, which have kept watch and ward over the destinies of India for over a century, and whose future task it is gradually to hand over their work to willing and eager, though but still partly untried, hands. Some day—though when, we do not venture to forecast—India will be a nation, and not a congeries of peoples. And the sooner that day, the better for the peace and good order of the world; for India's resources, in both agriculture and industries, are unlimited. From every point of view—whether international, political, or even from the point of view of international public health—India is the pivot of Asia.

Our visitors from foreign lands will not be numerous—at present they number just under 100—but they will include many whose names are of international reputation. Sir Malcolm Watson and Dr. A. Neave Kingsbury represent the Federated Malay States, but we regret that, owing to his recent retirement from active service, Dr. W. Fletcher of the Kuala Lumpur Institute will not be with us. The Hon. Dr. A. L. Hoops, Vice-President of the F. E. A. T. M., and Dr. J. W. Scharff, Hon. Secretary of the Association for the Straits Settlements, will also be present. Sir Ronald Ross and Sir Leonard Rogers have been invited among the guests of the Government of India, but it is unfortunately unlikely that they will be present. Lieut.-Col. S. P. James, I.M.S. (retd.), will represent the British Ministry of Health; whilst another distinguished retired member of the I. M. S. who will be present is Lieut.-Col. W. W. Clemesha. Dr. V. G. Heiser, Director in the East of the Rockefeller Foundation, will be one whose name is familiar to all members of the Association. Egypt will be represented by Dr. d'Herelle, of bacteriophage fame; and Northern China by Dr. Wu Lien Tuh, whose work on plague in Manchuria is well known. Amongst the distinguished foreign malariologists to be present, mention must be made of Professor Ziemann and Dr. Schüffner. Professor E. P. Snijders of the Institute for Tropical Medicine in Amsterdam will also be present, and Colonel F. de Mello, Director of Medical Services, Nova Goa—a well-known protozoologist. Dr. S. L. Brug, from Weltevreden in the Netherlands East Indies, is a second well-known protozoologist who will be attending the Congress. Japan is sending a strong contingent; it includes Dr. K. Shiga, of dysentery bacillus fame; Dr. S. Hata, who, with Ehrlich, discovered salvarsan; and Dr. I. Inada, the discoverer of *Leptospira icterohæmorrhagiæ.*

Up to the moment of writing the total number of members is approximately 1,400, although it is expected that not more than some 600 will be present at the Congress itself.

* * * * *

The following is the programme for the Congress week, December 5th to 10th, as at present outlined.

PROGRAMME.

Saturday, December 3rd and Sunday, December 4th.—Information Bureau open for registration of members, distribution of badges and literature, and selection of excursions, visits, etc.

Sunday, December 4th.—Special Services in St. Paul's Cathedral and St. Andrew's Church.

Monday, December 5th, 10 a.m.—Opening of the Congress by H. E. the Governor of Bengal in the University Senate House.

11-30 to 1 p.m.—Meetings of sections.
2 p.m. to 4 p.m.—Meetings of sections.

4-30 p.m. to 7-30 p.m.—Conversazione at the Calcutta School of Tropical Medicine, and opening of the Scientific Exhibition.

9-30 p.m.—Reception by H. E. the Governor of Bengal at Government House. (Mess dress, or evening dress with decorations.)

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Tuesday, December 6th, 10 a.m. to 1 p.m.—Meetings of sections.

2 p.m. to 4 p.m.—Meetings of sections.

4-30 p.m.—Visits and excursions; (Calcutta Medical College Hospitals, Presidency General Hospital, Association for the Cultivation of Science. Demonstration by Professor C. V. Raman, F.R.S., at the last mentioned.)

6-30 p.m.—Lecture and demonstration by Sir J. C. Bose, F.R.S., at the Institute for Science, on plant life.

Wednesday, December 7th, 10 a.m. to 1 p.m.—Meetings of sections.

2 p.m. to 4 p.m.—Meetings of scientific sections. Demonstration of cinema films on scientific subjects at the Calcutta School of Tropical Medicine.

4-30 p.m.—Conversazione by the President and Members of Council of the Asiatic Society of Bengal, and the Trustees of the Indian Museum.

9-30 p.m.—Play in an Indian theatre (if possible).

Thursday, December 8th, 10 a.m. to 1 p.m.—Meetings of sections.

2 p.m. to 4 p.m.—Meetings of sections.

Demonstration of cinema films on scientific subjects at the Calcutta School of Tropical Medicine.

4-30 p.m.—Visits and excursions. (Carmichael Medical College, Bengal Pharmaceutical and Chemical Works, Bengal Immunity Co.)

Friday, December 9th, 10 a.m. to 1 p.m.—Meetings of sections.

2 p.m. to 4 p.m.—Meetings of sections.

4-30 p.m.—Garden party at Government House. (Morning dress.)

Saturday, December 10th, 10 a.m. to 1 p.m.—Meetings of sections.

2-30 p.m.—River trip arranged by the Port Commissioners; or visit to Calcutta Waterworks; or visit to the Co-operative Anti-Malaria Societies; or bus tours round Calcutta. (Parties arranged as necessary.)

8-15 p.m.—Congress dinner at Belvedere. (Mess dress for those in possession of it; evening dress with decorations for others.)

* * * * *

In medical matters, as in others, Calcutta may perhaps claim to be the "second city in the Empire," whilst—unfortunately—as any morning's observation at the out-patient clinic at the Calcutta School of Tropical Medicine or at the Calcutta Medical College will show, she can present a wealth of tropical diseases probably unrivalled by any other city in the world. The Medical College is now of venerable age; in fact, as a teaching institute it was a precursor to many of the London hospitals, and was probably one of the first—if not the first—medical college in the British Empire to lay down a standard curriculum, about a hundred years ago. The Campbell Medical School, though of more recent origin, runs it a good second, and is one of the finest and best organised medical schools for training men of the sub-assistant surgeon class—(and many of them are men of the finest calibre, and of keen and active intelligence). The Presidency General Hospital, with its splendid Woodburn ward, is a model of what hospitals for Europeans in the tropics should be like. The Carmichael Medical College is unique in being a large private institution which is not controlled by Government though it has received large grants from the Government of Bengal. The water-supply of Calcutta is a very serious—and at present, a very urgent—problem. It is taken in from the Hooghly at Barrackpore, and the settlement tanks in connection with it are amongst the largest in the world. The introduction of tube wells as an accessory source of water-supply in Bengal is another point which is worth the consideration and inspection of our visitors. In the huge Bengal jute industry such problems loom large as the disposal of night-soil from a crowded population of the labouring classes, and the question of over-congested areas and slums in the neighbourhood of large factories. The septic tank latrine system has been very largely used in Bengal, and its application in a tropical country is worthy of study.

A special word should be said of the Co-operative Anti-malarial Societies in Bengal. These are essentially village institutions on a voluntary basis, and their activities against malaria and kala-azar are among the most noticeable features of public health work in the province.

The moving spirit from the outset has been Rai Bahadur Dr. G. C. Chatterji.

Further features in Calcutta which our visitors may find of interest are the enormous new King George's docks, which are being constructed by the Calcutta Port Trust; when completed, they will be perhaps the finest system of docks in the world, whilst their construction has involved engineering problems of special difficulty, as the bed is entirely of clay. The scenery of Bengal is well worth viewing by a trip up river, whilst the scientific and literary side of social life in Bengal is well represented by the Asiatic Society of Bengal; the Indian Museum; and the special lectures and demonstrations by Dr. Raman and Sir J. C. Bose. The extensive manufacture of chemicals, drugs, vaccines, sera, etc., will be studied at visits to the Bengal Pharmaceutical and Chemical Works and the Bengal Immunity Co.

Turning to the actual sectional meetings of the Congress, India will have no need to be ashamed of the standard set. Up to date 145 papers have come in, and have been considered by a special sub-committee. There is no great epoch-making discovery to be recorded at the Congress, but there is a very large volume of steady and persistent medical research work to be reported on, and many of the papers are of a very high order of merit; also many papers of very great interest sent in from foreign countries. Miss Margaret Balfour's study of the special diseases of pregnancy in India, with special reference to communities, is a very fine piece of work, and most ably reported on. Colonel Mackie and Dr. Hamilton Fairley are to give an account of the research work on sprue carried out at the Haffkine Institute, Bombay.

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Many of the papers deal with leprosy, notably those by Dr. E. Muir, and a paper by Dr. R. S. Donaldson on leper settlement development. Major R. B. Lloyd, I.M.S., discusses the Wassermann reaction in tropical medical practice, coming to the conclusion that a positive Wassermann reaction means syphilis, even when some other disease is co-existant with it. Lieut.-Col. A. J. H. Russell, I.M.S., is to give an account of his investigations into epidemic cholera in Madras, and of the organisation which he has built up to combat it. The same author also discusses the Malthusian proposition with reference to public health conditions in India—a paper which will probably arouse some discussion. Dr. Inada contributes a paper on the leptospiræ, and Dr. Brug of Java and Colonel Froilano de Mello of Nova Goa several papers of great protozoological interest. Dr. S. Hata discusses the factors influencing the therapeutic value of salvarsan solutions, and Dr. Wu Lien Teh the problems of pneumonic plague in Manchuria. Important entomological papers are being contributed by Colonel Christophers, Major Sinton, and Captain Barraud Dr. Tomb and Captain Maitra, I.M.S., will give an account of their work on cholera in the Asansol Mining Settlement, of their method of open bowl cultivation of the vibrio, and of the relationship of agglutinating to non-agglutinating strains. Major R. N. Chopra, I.M.S., deals with the opium habit in India; with his newly discovered antimony test for kala-azar; and will give an account of his work during the past six years on Indian indigenous drugs. The same author discusses the pharmacological action of the cinchona alkaloids on the heart and uterus, and, with Colonel Acton, I.M.S., the mode of action of quinine on the malaria parasites. Malaria in Bengal is dealt with by Mr. M. O. T. Iyengar, who also gives an interesting account of the protozoal and nematode parasites of Anopheles larvæ. Several papers are contributed by the workers in Colonel Acton's skin clinic, and tropical dermatology in general will constitute quite a feature of the Congress. An important series of papers is that by Dr. d'Herelle on the bacteriophage and its applicability in the treatment and prophylaxis of epidemic intestinal diseases. Helminthology is chiefly represented by papers on filariasis and on ankylostomiasis surveys.

In addition to the general papers sent in, arrangements have been made for set discussions on certain subjects, and for speakers selected for these discussions. Thus Dr. Ruth Young will open a discussion on maternity and child welfare: and anti-malaria measures will be discussed by Sir Malcolm Watson, Colonel S. P. James, Colonel Gill, Dr. Bentley, Dr. Wellington, Dr. P. F. Russell, Dr. Schüffner, Dr. Cilento and Dr. Ziemann. Colonel Christophers will open a discussion on measurement of the enlarged spleen; to be followed by Major Sinton, Major Covell, and Dr. Russell. The subject of the treatment of malaria will be introduced by Colonel James, followed by Major Sinton, Colonel Acton and Colonel McGilchrist. Lieut.-Col. R. Knowles will open the discussion on the transmission of kala-azar; to be followed by Colonel Mackie, Major Shortt, Dr. L. E. Napier, Colonel McCombie-Young and Colonel Row; whilst Dr. U. N. Brahmachari and Dr. Napier will discuss the treatment of the same disease. Plague will be discussed by Colonel Mackie, Dr. Otten, Dr. Wu Lien Teh, Dr. Heiser, Colonel Forster, Colonel Dunn, Dr. Goyle and Dr. Naidu. Dr. Bentley will open a discussion on the epidemiology of cholera; to be followed by Colonel Russell, Dr. Tomb and Captain Maitra. Rai Bahadur Dr. Lal Behari Ganguly of the Campbell Hospital, Calcutta, will open the discussion on the treatment of cholera. Dr. Ganguly has for many years been in charge of the cholera wards at the Campbell Hospital, and has probably had more extensive clinical experience of the treatment of cholera than any other worker in the world, whilst his meritorious services in this connection have received the special acknowledgment of Government. The ætiology and prevention of dysentery will be discussed by Colonel Cunningham; to be followed by Colonel Acton, Colonel Knowles and Major Manifold. The subject of leprosy will be introduced by Sir Leonard Rogers (if present at the Conference); followed by Dr. Muir. The present position with regard to deficiency diseases will be introduced by Colonel McCarrison, followed by Dr. A. M. de Langen, whilst we hope that the Japanese delegates present will have much of interest to present to the Congress in this connection. Sir Frank Connor is to open the discussion on filariasis; followed by Dr. Vishnu Korke; it is likely that this discussion will be a most interesting one, with several speakers, as there will be many attending the Congress who have made a special study of the disease. The systematics and bionomics of the anophelines will be discussed by Colonel James, Dr. A. F. Stanton, Dr. V. A. Stookes, Dr. J. Borel, Dr. N. W. Cilento, Dr. Taylor, Dr. Koidzumi, Major Sinton, Major Covell, Dr. Strickland, Mr. Iyengar and Mr. Puri; Major Sinton will open the discussion on the systematics and bionomics of sandflies; and Dr. Brooks and Captain Barraud will discuss the culicines.

Taken in general, these set discussions are likely to be an especially interesting feature of the Congress, and will be exceedingly informative. The Exhibition will be still another special feature of the Congress; its scientific side is to be held in the Calcutta School of Tropical Medicine and adjacent buildings; whilst the commercial section will be held in the Anatomy Department of the Calcutta Medical College. Catalogues of the Exhibition will be available at the information bureau. The transport, cars, motor buses, etc., for the Congress will carry a green flag with a white triangle in the centre of it, inscribed with the letters F. E. A. T. M.

The official week of the Congress in Calcutta will terminate with the dinner at Belvedere; and on the 11th December the three tours for foreign

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delegates, organised by the Government of India, and arranged by Thos. Cook and Sons, will commence. The Northern Tour will visit the medical institutions and places of historical interest at Benares, Lucknow, Delhi, Lahore, Kasauli and Agra. The Southern Tour will include visits to Madras, Coonoor, Ootacamund, Mysore and the Western Ghats. These two tours will both terminate in Bombay on December 20th. The Short Tour will include visits to the ancient Buddhist temples and remains at Gaya, to the new Prince of Wales' Medical College at Patna, to Jamshedpur (Tatanagar), Ranchi and Purulia, finally returning to Calcutta.

The account which we have given of the present organisation for the Congress shows what splendid work has been done by Lieut.-Col. J. Cunningham, I.M.S., the General Organising Secretary and by Lieut.-Col. A. D. Stewart, I.M.S., the Local Secretary in Calcutta. The various committees and sub-committees concerned have also done much useful work. It only remains to add that we hope that the Congress will be a memorable one in the annals of the Association, and worthy of the proud position which India has always held in the development of tropical medicine.

SIR NORMAN WALKER'S REPORT ON MEDICAL EDUCATION IN INDIA.

THE *British Medical Journal* for the 21st August, 1927, gives a summary of the report which was recently made to the Secretary of State for India by Sir Norman Walker, who visited India last cold weather to make a survey of medical education in this country.

The report is just what we would have expected from Sir Norman. It is eminently sane and helpful; if the suggestions which are made can be carried out, the results will be greatly to the advantage of India.

Sir Norman points out that new problems have arisen, owing to the provincialisation of medical administration. Men are now being appointed to professorships who have had but small experience of teaching, and it is suggested that these should have a period of study abroad before they are appointed to chairs.

It is pointed out that students commence the study of medicine at the age of 16, or one year earlier than in England; also that the standard of secondary education in India is lower than in Great Britain. Sir Norman suggests that all the Indian universities might with advantage follow the lead of the Calcutta University, where a six years' curriculum has been adopted, including the study of chemistry, physics and biology as subjects allied to medicine.

He is satisfied with the provision for teaching anatomy, physiology, pathology, materia medica and pharmacology and hygiene. The teaching in medicine, surgery, and midwifery however is on lines similar to those followed by the medical schools in Great Britain twenty years ago. There has been an improvement in the teaching of practical midwifery during the past five years, especially in Madras, Bombay, Calcutta and Lahore. The ophthalmic departments of the hospitals concerned are especially singled out for honourable mention, that of the Madras Ophthalmic Hospital being described as the finest in the world. Sir Norman has a special word of praise for the hospital architects of India, and says that some of the newer hospitals are really excellent.

He considers that the special departments for the diseases of children; nose, ear and throat; skin and venereal diseases; and tuberculosis, have a long way to go to catch up with the standard of ophthalmology prevalent in this country; whilst the arrangements for teaching with regard to mental diseases leave much to be desired, chiefly owing to the fact that the large asylums of India are usually situated at a distance from the medical schools and colleges.

There is a good word for research. Calcutta is stated to have one of the foremost Schools of Tropical Medicine in the world; and the medical research institutes at Kasauli, Bombay and Madras are all said to be doing admirable work; but it is greatly to be desired that medical research should also be active in many other centres, notably the universities.

The greatest defect in medical education in India, Sir Norman considers to be the lack of a central co-ordinating authority between the different universities and examining boards concerned. The universities should be independent, but there should be the provision of some common minimum standard by some adequate machinery, other than periodical inspections of examinations through the agency of the General Medical Council of Great Britain.

Sir Norman believes that the time has come for the creation of a General Medical Council, or analagous body, for India; but, as this will take some time, he advocates the immediate appointment of a Commissioner of Medical Education and Standards, with an office at Delhi, to continue and extend the work already done by Colonel Needham, who has been the Inspector of Examinations under the General Medical Council of Great Britain. The proposed Commissioner would be accepted by the General Medical Council as their visitor, and his reports would be of much assistance in determining whether recognition of medical degrees should be accorded or continued.

So far as Sir Norman's report is concerned, India has much reason to be grateful for his helpful and sympathetic criticism. What is now needed is the cordial co-operation of the Indian Universities and Governments in giving effect to the reforms which have been advocated. In some quarters there has been a tendency to resent criticism or suggestions for improvement, and this attitude has been one of the greatest obstacles in the way of reform.

It should be remembered that the criticisms which have been made are directed against a system for which the members of the Indian Medical Service have chiefly been responsible;

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these officers themselves being the first to recognise the need for improvement—not because they are opposed to the advance of medical education, but because they are now, as always, wholeheartedly in favour of progress. They have never taken up the position that everything is for the best in the best of all possible worlds of medical education in India. They have loyally accepted the changes which have been brought about in consequence of the new scheme of government; but, while some of them are still responsible for playing a part in the system of medical education in India, it is their duty to press forward rather than sit with folded hands. It is 'up to them' to continue their good work for the country, whose servants they are, and to disregard the vilification to which they have been subjected by a small minority of carping critics, whose motives are not easy to understand.

J. W. D. M.

MALARIA PROPHYLAXIS.

THE conclusions of the Malaria Commission of the League of Nations were outlined by Lieut.-Col. S. P. James in the opening paper of a discussion in the section of tropical diseases at the last Annual Meeting of the British Medical Association; Col. James was the official secretary of the Commission, and so is specially qualified to give an authoritative account of the conclusions which were arrived at. The primary object of the Commission was to find out what anti-malarial measures are most appropriate in certain European countries which are unable to afford expensive methods of prevention, so their conclusions are of special interest to India.

Many expert malariologists were engaged on the enquiry for the past three years, and among these there were representatives of various schools of thought, so that the conclusions necessarily represent a compromise or "average opinion." The conclusions may be briefly summarised as follows:—

1. The ideal of eradication of malaria is not practicable in most countries: all that can be hoped for in the first instance is a great reduction in the severity and incidence of the disease, such as has been attained in England, Holland and Denmark.

It will be agreed that if India could attain to such a degree of success as has been reached in European countries we should have no reason to complain of lack of success.

2. It is not necessary to limit our efforts to measures connected with mosquito control: malaria may be greatly reduced without any diminution in the number of anophelines.

3. There is no single method of malaria control which is best for every locality. A local survey should be made by competent observers before a decision is reached as to the method of control which is best adapted to each place.

4. It is better to concentrate on one or two selected methods of control in the first instance, and if these are insufficient to add further methods systematically until the desired end is attained.

5. It is often wasteful to imitate slavishly the methods of control which have proved effective in other countries. Local conditions should be taken into account in each country.

6. The first and most important measure in each place is to arrange for treatment. The State must provide an efficient organisation for a free supply and effective distribution of quinine.

Wherever possible there should also be a provision for expert diagnosis, if possible by using the services of the medical practitioners who are already established in the place. These should be subsidized by the State for this purpose.

7. A reduction in the mortality and severity of the disease is far easier to secure than a striking reduction in the incidence of the disease. Quinine does not prevent the occurrence of malaria, but it is exceedingly effective in preventing severe and fatal forms of the disease from appearing.

Regular inspection of school children and the adult population should form part of the system of control.

8. The systematic destruction of mosquitoes in the dwelling houses is regarded as a valuable measure. Householders should be instructed in the means by which malaria is conveyed; they should be shown how to find and kill domestic mosquitoes, how to make the house inhospitable to the insects by cleanliness, light and ventilation; and they should be impressed by the fact that mosquitoes are noxious vermin which should be avoided, just in the same way as bed bugs, lice and fleas.

9. Agricultural reclamation and improvement of the economic condition of the people as a whole are of great value in diminishing the ravages of malaria.

The Commission evidently regards bonification of the soil as being of indirect rather than direct value; it may not cause any diminution in the Anopheles incidence, but by leading to better housing, greater vitality and, in fact, bonification of the people, valuable results will be secured.

Drainage should not be regarded as an anti-mosquito measure, but rather as a means of increasing the fertility of the soil and hence as a method of improving the economic condition of the people. There may even be an increase in the Anopheles population as a result of drainage, but in spite of this the ravages of malaria may be much diminished owing to the betterment of conditions of living. This betterment must be made to affect all who work on the soil, including the day labourers, otherwise great reclamation schemes may fail to affect the incidence of malaria.

Various other problems of malaria prophylaxis are dealt with in the report of the Commission, such as the organization necessary for the work, larvicides, housing and propaganda. Col. James made no reference to mosquito curtains or house screening, but we presume that the omission of these measures does not imply that they are considered unimportant.

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Great stress is laid on the value of research in the laboratory and the field. India is very fortunate in having Col. Christophers in charge of the anti-malarial research organisation: the organisation which he is engaged in building up will probably come to be regarded as a model for the rest of the world, and it is to be hoped that the Government of India will realize the importance of supplying him with the sinews of war which are needed for constructing a machinery which will be adequate for the handling of the vast malarial problem of India.

The report deals with European countries, and so the special problems of India are not dealt with, but the general principles are of universal application.

The great needs in this country are: (1) to get on with the application of the measures which have been proved to be universally effective; and (2) to institute systematic experiments in malaria control in a number of selected localities with a view to finding out which are most practicable and suitable for the varied conditions which prevail.

We must carefully avoid great expensive schemes which may be costly failures and which may set back the clock by discouraging others from making efforts of any kind. Malaria control will become unpopular if it does not pay good dividends.

On the other hand, there are many measures which are assured of success, such as education of medical men and the general public, sane propaganda, efficient diagnosis and treatment by quinine, personal protection against mosquitoes, bonification of the soil and people, and *after expert survey,* selected anti-larval measures. Purely experimental measures need not be conducted on the same lines as routine methods of control; the essence of an experiment is to find out what happens and an experiment which fails to yield any results may yet be of great value in preventing the waste of large sums of money on unsuitable measures. We need not only the further study of the scientific side of malaria but also experimental work on the practical application of existing discoveries, but we may be certain that Col. Christophers and his staff of experts can be relied on to tackle the problem in such a way as to build the foundations of a sound policy for malaria control in India.

J. W. D. M.

SPECIAL ARTICLE.

MATERNAL MORTALITY IN CHILDBIRTH IN INDIA.

By MARGARET I. BALFOUR, C.B.E., M.B.,

From the Haffkine Institute, Bombay.

THE investigation about to be detailed was undertaken in the hope of throwing more light on the conditions of Indian women during childbirth, on the causes of their mortality, and on the diseases from which they are most prone to suffer.

In most countries such information is obtainable, at least to a great extent, from the Public Health Departments. In India, through no fault of the Public Health Departments, such information is scanty. Medical certification of death is not required, indeed most deaths are unattended by medical practitioners. Births also are often unreported. Hence little reliable information is obtainable from Public Health Reports regarding the diseases of pregnancy and labour.

Although India is advancing rapidly in some directions, she is still backward as regards women's progress. Over large tracts of country the women of all classes lack education, are unacquainted with modern sanitary developments, and above all cling to their ancient methods and practices as regards pregnancy and childbirth. Men are severely excluded from the lying-in room, which is the kingdom of the indigenous *dai* or country midwife. In many parts of India these women form a hereditary caste handing down their practices from mother to daughter, or from mother-in-law to daughter-in-law. They are quite illiterate, they have no knowledge of modern midwifery or asepsis, they are dirty in their dress and habits, and they usually fail to detect abnormal conditions until too late. It is not uncommon for a woman to die undelivered, and only too common for her to die during or after the operation which carried out earlier would have been a simple one. Yet in most parts of India the *dai* still reigns supreme in the lying-in room.

The gradual growth of modern hospitals, especially those officered by women, has had its effect in lessening the horrors of Indian childbirth. Most of the larger towns now have a hospital with a qualified woman doctor, and in the capital towns in the South, East and West many women come for confinement to the Government Maternity Hospitals. Schemes for training and supervising indigenous *dais,* and also for supplying trained midwives are growing more frequent as the public conscience is aroused.

It has been taken for granted that the troubles are mostly due to bad attendance at the time of labour, but those who have had much experience in maternity wards are aware that there are also severe diseases of pregnancy for which the *dais* are not responsible and which contribute largely to the fatal results. It was with the view of ascertaining the relative importance of these diseases that the present investigation was undertaken.

In order to gain information I sent out a questionnaire to the medical officers in charge of a number of maternity hospitals and wards in different parts of India, asking that details of cases of childbirth treated should be sent to me for a period of one year. I received a generous response, and I am glad to have this opportunity

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of thanking these medical men and women for the trouble they have taken in supplying the information.

Particulars of 11,343 cases of labour have been received. These figures do not, of course, represent the correct rate of maternal mortality in childbirth, as the abnormal cases in hospitals are always high. They probably represent fairly the diseases which cause death in childbirth in India and to some extent the correct proportions of these diseases. If more women in a town or district are suffering from eclampsia, severe anæmia, or obstructed labour, more will find their way to hospital. This applies to the more serious cases but scarcely to the slighter diseases. Women suffering from such symptoms as albuminuria or pyrexia will come to hospital or stay at home according to the popularity of the institution or other reasons. I have therefore in classifying the cases left out of consideration those of albuminuria and pyrexia from ordinary causes, as their inclusion would only give a misleading idea of their prevalence in India.

The figures are put up for the sake of comparison with:—

(1) Figures taken from the clinical reports of some representative British Hospitals. (1).

(2) Figures from the clinical reports of the Government Maternity Hospital, Madras. (2).

(3) Figures from the report of a special enquiry on vital statistics in Bengal. (3).

Table I gives the rate of different abnormal conditions, and the death-rate from these conditions per 1,000 total cases. It shows that in India:—

(1) Anæmia and osteomalacia (unknown or rare in the British Hospitals) were serious causes of disease and death.

(2) Admissions for hæmorrhage and eclampsia were almost the same as in the British Hospitals.

(3) Admissions for sepsis were greater.

(4) Admissions for other diseases and accidents of pregnancy and labour were less.

(5) In every class the mortality was considerably greater than in the British Hospitals.

TABLE I.

Incidence of Certain Abnormal Conditions per 1,000 *Total Cases. Deaths per* 1,000 *Total Cases.*

Source of Cases.	Total Cases.	Abnormal Cases.	Ratio Abnormal to 1,000 Total.	Hyperemesis.	Eclampsia.	Anæmia	Osteomalacia.	Hæmorrhage.	Sepsis.	Other Accidents and Diseases of Pregnancy and Labour.	Number of Deaths.	Pulmonary Embolism.	Hyperemesis.	Eclampsia.	Anæmia.	Osteomalacia.	Hæmorrhage.	Sepsis.	Other Accidents and Diseases of Pregnancy and Labour.	Total.
British Hospitals.	5,218	1,367	261·9	5·5	12·8	..	..	36·6	24·1	182·88	48	0·3	1·11	1·7	..	..	1·7	2·4	1·3	9·0
Indian Hospitals (questionnaire).	11,343	2,627	231·5	..	12·5	37·5	24·4	35·6	33·4	88·0	244	0·1	..	2·2	7·6	1·9	2·5	3·8	3·1	21·5
Madras Maternity Hospital (1923—25)	8,599	..	..	..	15·3	11·6	..	12·7	22·4	189·9	133	..	..	1·8	2·5	..	2·4	3·3	5·3	15·3
Bengal Enquiry.	3,844	..	..	..	..	..	..	..	..	..	47	..	..	1·5	*1·3	..	1·3	6·2	1·0	12·1

* In the Bengal Report these deaths are ascribed to "exhaustion."

Table II gives the rate of certain abnormal conditions per 100 abnormal cases, and the death-rate from these conditions per 100 deaths, that is it shews the relative importance of the different abnormal conditions in causing disease or death. The most important fact to notice is that in India 31 per cent. of the abnormal cases and 54 per cent. of the deaths were caused by diseases of pregnancy, while in Britain only 7 per cent. of the abnormal cases, and 35 per cent. of the deaths were so caused. (Accidental haemorrhage has not been included in this estimate).

As Table II does not shew clearly the comparative frequency of the diseases common to

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TABLE II.

Incidence of certain abnormal conditions per 100 abnormal cases.

Source of Cases.	Total Cases.	Abnormal Cases.	Ratio Abnormal to 1,000 Total.	Hyperemesis.	Eclampsia.	Anæmia.	Osteomalacia.	Hæmorrhage.	Sepsis.	Other Accidents and Diseases of Pregnancy and Labour.	Total.
British Hospitals	5,218	1,367	261·9	2·12	4·89	..	..	13·97	9·21	69·78	99·97
Indian Hospitals (questionnaire).	11,343	2,627	231·5	..	5·40	16·21	10·54	15·37	14·42	38·02	99·96
Madras Maternity Hospital.	8,599	..	..	..	..	..	..	..	.	..	..
Bengal Enquiry ..	3,844	..	..	..	..	..	..	..	..	..	..

*Deaths due to certain causes per 100 deaths.**

Source of Cases.	Number of Deaths.	Pulmonary Embolism.	Hyperemesis.	Eclampsia.	Albuminuria.	Anæmia.	Osteomalacia.	Hæmorrhage.	Sepsis.	Other Accidents and Diseases of Pregnancy and Labour.	Tetanus.	Total.
British Hospitals	48	4·16	12·50	18·75	4 16	..	..	18·75	27·08	14·58	..	99·98
Indian Hospitals (questionnaire).	244	82	..	10·24	..	35·65	9·01	11·88	17·62	14·75	..	99·97
Madras Maternity Hospital.	133	..	..	12·93	..	16·54	..	15·78	21·05	34·58	..	99·98
Bengal Enquiry ..	47	..	..	12·78	..	10·63	..	10·63	51·06	8·51	6·38	99·99

* That is, deaths directly due to pregnancy or labour.

both countries, owing to the extent to which the Indian figures are overshadowed by anæmia and osteomalacia, Table II (*a*) has been prepared shewing the comparative frequency and relative mortality of the diseases common to both countries. This table shews that the largest remaining cause of death in India is the class named "other diseases and accidents of pregnancy and labour" which includes most of these cases of neglect and malpractice already alluded to. This will be remarked on later.

Tables III, IV and IV (*a*) are prepared similarly to Tables I, II and II (*a*), but shew the figures classified according to the part of India from which they come.

"India North" includes Baluchistan, the Punjab, Delhi and United Provinces. "India West" includes the Bombay Presidency and Sind. "India South" is the Madras Presidency. The remaining figures are either too small or too widely apart to be easily classified. From Bengal, I only received returns from two hospitals.

A marked difference is seen in the proportion of abnormal cases in the different divisions. India North with less than half the total cases has nearly as many abnormal cases as the other divisions. This is only to be expected as North India is above all things conservative as regards women, and they seldom enter a maternity hospital unless they fear an abnormal condition. In the South and West there is far less prejudice, and maternity hospitals and homes are well attended. The second noteworthy feature is the entire absence of osteomalacia in the South.

Table V shews the number of cases, the deaths, and the case mortality in certain classes of abnormal cases. In each class the case mortality is considerably higher in the Indian than in the British Hospitals.

The more important diseases.

Eclampsia.—The incidence in the British and Indian Hospitals was about the same. The case mortality in India was higher, but the disease took a lower relative share in the mortality owing to the prevalence in India of other fatal diseases.

Comparing the different parts of India the incidence appeared to be greatest in the South and the relative mortality higher, but the case mortality was less than in the British Hospitals or than in other parts of India. This is to some extent confirmed by reference to the clinical reports of the Madras Maternity Hospital for the years 1923, 1924 and 1925 where it is stated 142 cases of eclampsia were treated with 16 deaths, a case mortality of 11.3 per cent.

Bengal is said to suffer severely from eclampsia. I had returns from only two hospitals giving particulars of 58 abnormal cases, of which 18 were eclampsia—a very large proportion. The case mortality was 22.7 per cent.

Osteomalacia.—A noteworthy fact as regards this disease was its complete absence from the Madras Presidency. This fact has already been recorded in the enquiry held by Dr. Agnes Scott

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TABLE II (A)

Relative Incidence of Certain Abnormal Conditions in British and Indian Hospitals when Diseases not Common to both are Excluded.

Relative Deaths in Certain Abnormal Conditions when Diseases not Common to both Countries are Excluded.

Source of Cases.	Total Cases.	Certain Abnormal Cases.	Eclampsia.	Hæmorrhage.	Sepsis.	Other Diseases and Accidents of Pregnancy and Labour.	Total.	Number of Deaths.	Eclampsia.	Hæmorrhage.	Sepsis.	Other Diseases and Accidents of Pregnancy and Labour.	Total.
British Hospitals ..	5,218	1,338	5·00	14·27	9·40	71·30	99·97	38	23·67	23·67	34·21	18·42	99·97
Indian Hospitals ..	11,343	1,978	7·38	22·24	19·81	50·55	99·98	133	18·79	21·80	32·33	27·06	99·97

TABLE III.

Incidence of Certain Abnormal Conditions per 1,000 Total Cases in Different Parts of India.

Deaths per 1,000 Total Cases in Different Parts of India.

Source of Cases.	Total Cases.	Total Abnormal Cases.	Rate of Abnormal Cases per 1,000 Total Cases.	Eclampsia.	Anæmia.	Osteomalacia.	Hæmorrhage.	Sepsis.	Other Accidents and Diseases of Pregnancy and Labour.	Total Deaths.	Death rate per 1,000 Total Cases.	Eclampsia.	Anæmia.	Osteomalacia.	Hæmorrhage.	Sepsis.	Other Accidents and Diseases of Pregnancy and Labour.
North ..	1,663	691	415·48	15·03	31·87	85·38	67·34	62·53	153·35	68	39·66	3·00	7·21	9·62	6·61	3·60	9·62
West ..	4,726	764	161·59	7·40	45·49	11·84	28·10	19·67	49·09	93	20·08	1·26	10·58	0·42	1·48	4·44	1·90
South ..	3,331	634	190·31	14·10	25·51	Nil	25·21	42·03	83·46	45	14·10	1·20	5·70	Nil	1·80	3·60	1·80

TABLE IV.

Incidence of Certain Abnormal Conditions per 100 Abnormal Cases in Different Parts of India.

Deaths due to Certain Causes per 100 Deaths in Different Parts of India.

Source of Cases.	Total Cases.	Total Abnormal Cases.	Ratio Abnormal to 1,000 Total Cases.	Anæmia.	Osteomalacia.	Eclampsia.	Hæmorrhage.	Other Accidents and Diseases of Pregnancy and Labour.	Sepsis.	Total.	Number of Deaths.	Pulmonary Embolism.	Anæmia.	Osteomalacia.	Eclampsia.	Sepsis.	Hæmorrhage.	Other Accidents and Diseases of Pergnancy and Labour.	
North ..	1,663	691	415·5	7·8	20·5	3·6	16·2	36·9	15·0	100·0	68	2·94	17·6	23·5	7·3	8·8	16·1	23·5	99·9
West ..	4,726	764	161·6	28·1	7·3	4·5	17·4	30·3	12·1	99·7	93	..	53·1	2·1	6·3	21·2	7·4	9·5	99·6
South ..	3,331	634	190·3	13·4	..	7·4	13·1	43·8	22·0	99·9	45	..	40·4	..	8·5	25·5	12·7	12·7	99·8

TABLE IV(*a*).

The same as above but with Diseases not Common to both Countries Excluded.

North ..	1,663	496	298·2	..	..	5·0	22·5	51·4	20·9	99·8	40	5·0	..	..	12·5	15·0	27·5	40·0	100·
West ..	4,726	493	104·3	..	..	7·0	26·9	47·0	18·8	99·7	42	..	..	..	14·2	47·6	16·6	21·4	99·8
South ..	3,331	549	164·8	..	..	8·5	15·30	50·6	25·5	99·9	28	..	..	..	14·2	42·8	21·4	21·4	99·8

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TABLE V.

Case mortality in	Eclampsia.			Osteomalacia.			Anaemia.			Haemorrhage.			Sepsis.			Other diseases and accidents of pregnancy and labour.			Total.		
	Cases.	Deaths.	Percentage Mortality.	Cases.	Deaths.	Percentage Mortality.	Cases.	Deaths.	Percentage Mortality.	Cases.	Deaths.	Percentage Mortality.	Cases.	Deaths.	Percentage Mortality.	Cases.	Deaths.	Percentage Mortality.	Cases.	Deaths.	Percentage Mortality.
British Hospitals.	67	9	13·43	..	..	..	..	..	..	191	9	4·71	126	13	10·31	954	7	0·73	1,338	38	2·8
Indian Hospitals.	142	25	17·6	277	22	7·9	426	87	20·4	404	29	7·1	379	43	11·3	999	36	3·6	2,627	242	9·2
India, North	25	5	20	142	16	11·2	53	12	22·6	112	11	9·8	104	6	5·7	255	16	6·2	496	66	13·3
India, West	35	6	17·1	56	2	3·5	215	50	23·2	133	7	5·2	93	20	21·5	232	9	3·8	493	94	19·0
India, South	47	4	8·5	..	..	..	85	19	22·3	84	6	7·1	140	12	8·5	278	6	2·1	549	47	8·5

In drawing up this table 10 deaths in British Hospitals have been excluded (hyperemesis 6, albuminuric toxæmia 2; pulmonary embolism 2). 2 deaths in Indian Hospitals have been excluded (pulmonary embolism).

under the auspices of the Indian Research Fund Association in 1915 (4). During the present enquiry 1 case was reported from Bangalore.

Deaths in this class were not due to the disease but to its consequences. In many cases the patients were admitted with severe pelvic contraction and had been a considerable time in labour. Some had come from long distances. In 3 of the fatal cases, the patients had been 4 days in labour before admission and were already in a septic condition. Tables III and IV shew that a larger number of cases and a higher case mortality are reported from the North than from the West. This might be accounted for by greater delay in seeking advice or by a more severe type of disease. Both explanations are probably correct. Many cases occurred at Cawnpore, Delhi, Lucknow, Agra and Quetta, and a considerable number at Indore. Kashmir is said to be seriously affected, but no returns were sent in by the zenana hospital at Srinagar. No cases were reported from Bengal, but as already said the numbers reported were small. As a matter of fact osteomalacia occurs in Calcutta.

Anæmia of pregnancy is rare in most countries, but is a terrible scourge to women in childbirth in India. It is widespread, occurs at all ages and among all classes of childbearing women. It is still uncertain whether these cases are due to a single cause or to several causes. Typically, it is a disease of the second half of pregnancy, fairly acute, rapid in its progress, frequently accompanied by diarrhœa and often ending in premature delivery. Recovery may take place after delivery. The largest number of cases were reported from the Bombay Presidency, especially from Bombay City. The disease indeed accounted for 61.9 per cent. of all deaths returned from Bombay City and for 35.6 per cent. of those returned from India generally. It was least frequent in the North. The case mortality was 20.4 per cent. in the whole of India, but in some hospitals where the most severe cases congregated it was much higher. This disease has been variously stated to be a consequence of malaria, hookworm or syphilis. No connection has yet been traced to malaria beyond a tendency to the same seasonal incidence; the disease is not more prevalent in hookworm districts than in those in which this latter infection is rare; while as regards syphilis our results shew that less than half the cases are positive to Kahn's precipitation test. The investigation on anæmia is being continued at Bombay, and it is hoped to publish more details shortly.

Sepsis.—The extent to which puerperal sepsis prevails in India is a disputed question. The reports of the Health Officers for Bombay and Calcutta for 1924 record it as causing 64 per cent. and 61 per cent. respectively of the total deaths from childbirth, but it must be remembered that the great majority of the deaths are not verified by medical certificates, and many of these cases may be due to anæmia of pregnancy in which disease the temperature is almost always raised after delivery. In the special Bengal enquiry sepsis accounted for 51 per cent. of the deaths from childbirth. It is not certain if these cases were seen by the supervising doctors. In the returns of the questionnaire sepsis accounts for 19.6 per cent. of the deaths, and in the returns of the Madras Maternity Hospital for 1923-25 for 21 per cent. Sepsis as already pointed out is, no doubt, a disease which lends itself to treatment at home more than others, and it may be that the proportion is higher than the questionnaire shews. On the other hand, returns received from large midwives' organisations point to the incidence being extremely small. Of 18,392 cases delivered by the Madras Corporation nurses in 1922-24 under medical supervision, there were only 89 cases of sepsis and sapræmia and 3 deaths from sepsis. (5) Somewhat similar figures are obtained from midwives' organisations in other large towns.

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Although natural labour in India is rapid, and the *dai* frequently does not have time given to interfere it is her invariable practice after delivery to introduce a plug into the vagina containing various substances supposed to be necessary for the complete recovery of the mother. No precautions are taken even of ordinary cleanliness. A medical woman practicising in a remote and backward part of the country told me that she has frequently been obliged to do operations such as version or the application of forceps under circumstances which made anything approaching asepsis impossible, but the patients invariably recovered without a bad symptom. Other medical women have had the same experience. Possibly Indian women have acquired a good deal of immunity to septic organisms. When their vitality is lowered, owing to disease or necessary operation, sepsis develops. Occasionally an epidemic will occur owing to a *dai* infecting herself with some organism more virulent than usual, and every case she touches may become septic.

Hæmorrhage.—Reference to Tables I and II shews that more cases of hæmorrhage enter hospital in India than in Britain. There appears to be a greater tendency to post-partum hæmorrhage in India. Of 173 Indian cases, of which particulars were given, 31 per cent. were due to placenta prævia, 18 per cent. to accidental hæmorrhage and 50 per cent to post-partum hæmorrhage, in contrast to the British figures, 48 per cent. placenta prævia, 31 per cent. accidental hæmorrhage and 50 per cent. to post-partum hæmorrhage I have heard it suggested that the supposed comparative infrequency of sepsis in India is due to the frequency of post-partum hæmorrhage.

Other accidents and diseases of pregnancy and labour:—Under this heading I have placed cases of contracted pelvis not due to osteomalacia, malpresentations, etc. It is to this class that most of what may be called "*dai's* cases" belong. That is to say, unfortunate women who have been left dragging on in weary labour for long periods or have been subjected to too valiant attempts on the part of the *dais* to relieve them. It is no uncommon thing to find the arm pulled off from an impacted shoulder or the shoulders pulled off the after-coming head. Patients are sometimes brought after sloughing of the vagina has already begun owing to the long continued pressure. Or the uterus may be inverted owing to violent attempts to remove an adherent placenta. These are extreme cases, but they are not rarely seen, and with them all varieties of minor conditions of neglect and bad treatment. The children in these cases go to swell the large ranks of stillbirth or early infant mortality. The mothers sometimes die—the extraordinary thing is that they die so seldom—and when they recover they go to fill the beds of the women's hospitals in all parts of the country, many continuing to suffer for years or permanently from misplacements, fistulas, inflammation, etc.

This class of case shews a smaller incidence in the Indian figures than in the British. It may be that setting aside disease there is less tendency for abnormal complications in India than in Britain, but another explanation is that abnormal cases are not detected and are left to suffer at the hands of the *dais* until nature at long last relieves them either by delivery or by death. In Britain, with its full services of doctors and midwives and the activities of the Central Midwives Board, this could not occur.

Although this class of case has a smaller incidence than in Britain, it has a larger share in the mortality and reference to Table V shows that the case mortality is five times as high as in Britain. This is largely due to the fatal delay in seeking relief. Although the gradual progress of education and the propaganda carried on by Indian Welfare Societies and Baby Week Organisations should do something to improve the standard of midwifery practice, there is no doubt that the time has come for legislation to play its part. Large cities should be empowered to make the registration and inspection of *dais* and midwives compulsory, so protecting the public not only against the indigenous *dais*, who often err through ignorance but against the so-called trained midwife whose work is sometimes little above the level of her unqualified sister.

Natural labour in India.—The first question of interest is the proportion of natural labour. The only way in which we can get near a reply is by trying to fix approximately the rate of maternal mortality.

Reference to the Annual Report of the Commissioner for Public Health with the Government of India for 1922, at pages 91 and 92, shews a list with the rates of maternal mortality returned by a number of towns in India. These rates vary from 2 per 1,000 births for Akola to 38 per 1,000 births for Poona. Reference to the Public Health Reports of some of the Provinces shew even greater variations. These returns cannot be depended on, as the higher figures are sometimes due to deficient registration of births, and the lower figures to neglect on the part of the friends notifying the death to mention the recent delivery. I visited one town in Sind where a very high maternal mortality rate was given, and made a careful enquiry with the kind co-operation of the Public Health Department but could not find any evidence that the mortality from childbirth was greater there than elsewhere. I was told that the people of Sind usually ascribe any death occurring within 40 days of delivery to childbirth, and the recording clerk admitted that if any death were said to be due to childbirth he made no enquiry as to the length of time which had elapsed. This is possibly the explanation of the high maternal death-rates usually returned from towns in Sind.

At the same time we now know that the maternal mortality in India is largely caused by obscure diseases of pregnancy. It is quite

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possible that these diseases may be more prevalent in different parts of the country and even in certain towns, and therefore we should not too hastily decide that the variations are only caused by defective registration.

TABLE VI.

Maternal Mortality.

	Number of Cases.	Number of Deaths.	Rate per 1,000 Births.
Bombay Corporation Health Officer's Report, 1924	21,838	365	16·7
Calcutta Corporation Health Officer's Report, 1924	17,219	320	18
Madras Corporation Midwives, 1924	7,027	33	4·7
Bombay Corporation Midwives, 1924	1,850	9	4·8
Calcutta Corporation Midwives, 1924	4,380	9	2
Delhi Municipal Midwives, 1925-26	306	Nil	..
Simla Municipal Midwives, 1925-26	600	4	6·5
Bengal Enquiry, 1919-25 ..	3,844	47	12·2

Table VI shews figures as to maternal mortality collected from various sources. To take one town as in illustration.—In Bombay City great pains are taken to check vital statistics. The Health Officer estimates that only one-tenth of the births, which take place in the city, are unregistered. If the births are one-tenth higher than registered, the maternal death-rate will be one-tenth lower than in the table, that is 15 per 1,000. Deaths within 14 days of labour are ascribed to childbirth, unless they are obviously due to some other cause, such as cholera or snake-bite. Therefore, no doubt, some deaths are included in these figures which are not directly due to pregnancy, but on the other hand, others which take place several weeks after delivery will escape registration as due to childbirth. On the whole 15 per 1,000 seems a fair estimate of the maternal mortality rate of Bombay City. Whether the death-rate is the same in other cities, it is difficult to say. We have seen that 61 per cent. of the maternal deaths collected in Bombay City were due to anæmia of pregnancy which is probably a higher proportion than in other towns, but on the other hand, Bombay has a good service of doctors, hospitals, midwives and maternity homes, and the case mortality of most of the diseases works out at less than that of India as a whole.

It will be seen (Table VI) that the mortality in the midwives organisations is comparatively low. With the exception of the Calcutta cases all the figures include the results of cases seen by the midwives and sent to maternity hospitals. The lower mortality is, no doubt, partly owing to the prompt detection, and early treatment of abnormalities and to the more cleanly methods, but it is also partly due to the fact that women suffering from disease in pregnancy or accidents of labour often go direct to hospital without passing through the midwives' hands. Even this rate of mortality is greater than that for the whole of England which for the year 1925 was 3.86.

As regards rural areas, information is difficult to get. The diseases of pregnancy, though no doubt more frequent in cities, are not by any means confined to them. The Bengal enquiry already referred to is of great interest in this connection. The staff consisted of 3 medical men and 15 peons under the supervision of the Assistant Director of Public Health. The average population each year of the area under enquiry was 15,549 and the people were living in small towns and villages. The houses of all were frequently visited by the doctors. There were during the 5 years of the enquiry 3,844 conceptions with 47 deaths directly due to pregnancy or labour, that is 12.2 per 1,000 births. It is probable we should not be far wrong in stating the maternal death-rate for India as a whole at 10 to 15 per 1,000 births.

The following particulars were collected regarding natural labour.

(1) *Age,* Total cases 3,964.

The lowest age given was 13.

Below 15 years of age ..	10
15 to 19 ,, ,, ,, ..	619
20 to 24 ,, ,, ,, ..	1,140
25 to 29 ,, ,, ,, ..	1,169
30 to 34 ,, ,, ,, ..	629
35 and over ..	397

This may be compared with similar figures from the report of the Government Maternity Hospital, Madras for 1923. (3,319 cases.)

	Madras. Per cent.	Questionnaire. Per cent.
Under 15	.2	.2
15—19	19.2	15.6
20—24	39.7	28.7
25—29	24.1	29.4
30—34	12.6	15.8
35 and over	3.9	10.0

(2) *Duration of Labour.*—Total cases 1,318.

This may be compared with similar figures from the report of the Government Maternity Hospital, Madras for 1923. (1,518 cases.)

Hours in Labour.	Madras. Per cent.	Questionnaire. Per cent.
1— 6	24.5	32.0
6—12	42.6	41.4
12—18	22.3	18.4
18—24	10.7	8.0

(3) *Blood Pressure.*—Total cases 238 (normal). Average 104.

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(4) *Multiple Labour.* Total cases 4,101. 33 sets of twins, 1 triplets.

(5) *Living Children.* Total cases 4,072. Confinements 9,949, surviving children 5,519. Compare with similar figures from reports of Madras Maternity Hospital 1923-24, which shew 3,319 women had 11,321 confinements an average of 3.4 for each woman.

(7) *Incidence of Venereal Disease.* 100 consecutive cases of normal pregnancy, tested by Kahn's precipitation test, gave a positive reaction in 15 per cent. 122 unselected cases gave a positive reaction in 18 per cent.

This may be compared with the figures given in the report of the Medical Research Council (6) for women in Glasgow. In 1881 unselected cases, the Wassermann reaction was positive in 9.04 per cent. of cases.

(8)) *Average Birth Weight of Healthy Infants.* (2,836) 5.80 lbs.

This is a lower weight than was got in Bombay (see Table IX), and it is probable that in the All-India returns the heading " premature " was sometimes omitted.

(9) *Average Pelvic Measurements.* (400 normal cases.)

Interspinal	21.28 cm.	8.37 in.
Intercristal	23.19 ,,	9.12 ,,
External conjugate	17.61 ,,	6.93 ,,

pregnancy is uncommon. Detailed enquiry showed that even when cohabitation had begun very early, pregnancy, by a kind provision of nature, was usually delayed for at least a couple of years.

(2) *Consanguineous marriages.*—The marriage of first cousins is usually forbidden among Hindus, permitted but not encouraged among Christians, and is encouraged among Mahomedans even to several generations. Such marriages, especially in the second or third generation, are likely to affect the offspring unfavourably.

(3) *Literacy.* This is more advanced among Christians and Parsis than among Hindus and Mahomedans. At the time of the last census in 1921 literacy in Bombay was 553 per 1,000 for Christians, as compared with 185 for Hindus and 183 for Mahomedans per 1,000.

(4) *Purdah* is the custom which is probably most largely responsible for the disabilities of pregnancy in India. It is common in all Mahomedan communities and is practised by many Hindu women especially in the North. To women who live in small houses, it not only means an almost entire lack of physical exercise but often great deprivation of sunlight and fresh air. Many women who are not in purdah are somewhat similarly affected owing to the principle so universal in India that women should not appear much in public or go about alone especially if

TABLE VII.

Certain particulars according to Religion. (All-India Questionnaire.)

Religion.	No. Cases.	Mater. mortal. per 1,000 Births.	Stillbirth per 1,000 Births.	Neo-natal deaths per 1,000 Births.	Labours.	Surviving Children.	Surviving children per Woman.	Child, weight average lbs.
Brahmin ..	337	32	103	56	727	541	1·3	5·9
Other Hindu	2,339	30	123	57	5,824	3,043	1·3	5·7
Mahomedan	608	29	169	115	1,581	811	1·3	5·5
Christian ..	453	22	46	39	1,105	700	1·5	6

Religion and Caste. Table VII shows certain particulars according to religion. The cases so analysed are of the poorer classes with a sprinkling of the better classes. They come from widely different parts of country so that the habits and diets even of the same community no doubt differ. At the same time there are certain habits of these communities which are common throughout India and which might be expected to influence the particulars given in the table.

(1). *Early marriage.* This is commonest among Hindus and Mahomedans, less common among Christians and Parsis. Among 3,964 cases of labour reported (All-India) only 10 mothers were below 15 years of age. Among 2,059 reported in Bombay City only 6 were below 15 and 17 below 16 years of age. This indicates that, at least at the present time, very early young. Household work in a people of simple habits does not require much muscular effort and exercise for the sake of exercise is seldom taken. Diseases of pregnancy are more common among those who lead secluded lives and enjoy a fairly good diet.

Table VIII shows the principal diseases of pregnancy according to community for All-India (without Bombay) and for Bombay City. In both tables "other" community is almost entirely composed of Christians. The Parsi community is not included in the Bombay figures as I could not get facilities for research in the Parsi Lying-in Hospital.

It will be seen that there is a great preponderance of disease in the Mahomedan community. This is most noticeable in the Bombay figures. It is still evident but less marked in the All-India

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figures, probably because purdah is not observed among Hindus in Bombay and is fairly prevalent among Hindus in the North.

TABLE VIII.

Incidence of osteomalacia, eclampsia and anæmia by community in Bombay hospitals.

Community.	Total Cases.	Osteomalacia.		Eclampsia.		Anaemia.	
		Number of Cases.	Ratio per 1,000 Labours.	Number of Cases.	Ratio per 1,000 Labours.	Number of Cases.	Ratio per 1,000 Labours.
Hindu	2,066	6	2·9	8	3·8	83	40·1
Mahomedan	842	32	38·0	14	16·6	79	93·8
Others	801	nil.	..	3	3·7	39	48·6

Incidence of osteomalacia, eclampsia and anæmia by community in All-India hospitals (less Bombay).

Community.	Total Cases.	Osteomalacia.		Eclampsia.		Anaemia.	
		Number of Cases.	Ratio per 1,000 Labours.	Number of Cases.	Ratio per 1,000 Labours.	Number of Cases.	Ratio per 1,000 Labours.
Hindu	5,167	160	30·9	79	15·2	148	28·6
Mahomedan	1,273	79	62·0	31	24·3	46	36·1
Others	1,152	6	5·2	8	6·9	15	13·0

The Christian community is comparatively free from disease, except that the Bombay figures shew a fair share of anæmia. This is chiefly among the Goanese community, who often have a very defficient diet.

The following shows the proportion of stillbirth, premature birth and infant birth weight among the babies born at the Cama Hospital, Bombay.

TABLE IX.

Community	No. Cases.	Still-birth.	Prema-ture.	Birth Weight.
Hindu ..	100	17	4	6·23 lbs.
Mahomedan ..	100	24	10	6·33 ,,
Goanese Christ.	100	10	8	6·60 ,,
Other Christians	100	10	7	6·70 ,,
Mill workers ..	100	10	10	5·36 ,,

Leaving out the millworkers this works out at a stillbirth rate of 160 per 1,000 live births, with a minimum of 100 for Christians and a maximum of 240 per 1,000 for Mahomedans. These figures were got by taking 100 consecutive cases in each community healthy and full time, and counting those that had to be excluded in doing so for stillbirth and premature birth. The stillbirth figures, of course, being hospital ones are higher than those for the general population. The millworkers' babies were not born at the Cama, but at the Wadia Maternity Hospital.

It is noteworthy that the millworkers, with a high stillbirth rate and a low infant birth weight had a very small incidence of disease in pregnancy. These women, after working 9 or 10 hours daily in the mill, often do all the domestic work at home, and that too on a scanty diet. They are, as far as domestic habits go, at the opposite extreme from the Mahomedan women. The high incidence of stillbirth in the Mahomedan community was due to the prevalence of disease in pregnancy.

As regards infant birth weight some interesting facts were noted.

The average weight varied from 6.7 lbs. for Christians to 6.2 lbs. for Hindus and 5.3 lbs. for millworkers. This is not in accordance with the findings of the Medical Research Council (7) which conclude that the infant birth weight does not vary with social conditions or nutrition of the mother. The classes which were investigated in England however were only temporarily undernourished and the same may be said about German and Austrian mothers during the war. It may be very different when communities live for generations under unfavourable conditions of nutrition or hygiene.

In order to find out if the difference in the infant's weight depended on a different build of the mother, the mother's weight was taken in a number of cases but it was found that the average weight of the Hindu, Mahomedan and Christian women was about the same. In the case of the Hindu and Mahomedan babies the child weighed 6.63 per cent. of the mother's weight and in the case of the Christian babies it weighed 6.91 per cent. of the mother's weight (average).

This question of the difference in birth weights and the reason is still being investigated as it is believed it may throw some light on the subject of infant mortality.

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The low incidence of disease in pregnancy, the low incidence of stillbirths and the comparatively high infant birth weight in the Christian community indicate that the development of education will do something at least to reduce maternal and infant mortality. But education must be of the body as well as of the mind. Literacy in Hindu and Mahomedan women only too often means a year or two at a primary school and perhaps the ability to read their vernacular. Literacy with Christian women often means 6 or 8 years at a mission boarding school where they are trained in practical habits of hygiene as well as physical exercises. It is on such lines (not necessarily at boarding schools) that the education of Indian girls must proceed if it is to result in improvement of maternity and child welfare.

Something more is needed. It will take a long time to change domestic habits and bring hygiene into every Indian family. Therefore in the meantime we must investigate much more carefully the causation of these diseases which lead to so much maternal and infant mortality and must discover remedies which can be used now. Diseases of pregnancy in tropical climates should make a part of the teaching in every school of tropical medicine. Research in these matters should be carried out in all large centres of obstetric work. Charitable associations and rich Indians would do well to endow research scholarships to attract young Indian doctors into this sphere of work.

To Sum Up.

(1) The rate of maternal mortality is difficult to arrive at, but is much higher than in European countries. Statistics relating to it would be more reliable if recording clerks were instructed to enquire in the case of all women of the child-bearing age:—

(*a*) if labour had recently occurred.

(*b*) if so, the number of days which had elapsed when death took place.

(2) The nature of the mortality is largely due to obscure diseases which will not be remedied merely by training midwives or opening maternity wards. Careful medical research is needed to discover the causes and means of prevention of these diseases. As at least two of them are nearly unknown in Britain, medical practitioners who come to India from that country are unacquainted with them and little attention is paid to them in Indian medical schools and colleges. Instruction in the diseases of pregnancy in tropical countries should form part of the curriculum of all schools of tropical medicine and research scholarships should be offered to help their investigation.

(3) Registration of *dais* and midwives and arrangements for their suitable inspection should be carried out in all the more important cities. Antenatal clinics under experienced obstetricians should be organised in all large centres and should be schools for post-graduate or post certificate instruction for doctors and midwives.

(4) The purdah system appears to exercise a very prejudicial influence on pregnancy. Maternal mortality is least in the more educated communities but even in these it is more than double that of England.

References.

(1) *Clinical report of Queen Charlotte's Hospital, London*, 1922. *Clinical report of the Rotunda Hospital, Dublin*, 1922-23. *Clinical report of Simpson Memorial Hospital, Edinburgh*, 1925.

(2) *Clinical reports of the Government Maternity Hospital, Madras*, 1922-24.

(3) *Vérification of vital statistics in certain typical areas of the district of Murshidabad.* By B. B. Brahmachari, D.P.H.

(4) Contribution to the study of osteomalacia in India. By Agnes C. Scott. *Indian Journal of Medical Research*, Vol. IV, 1916-17.

(5) *Corporation of Madras, Annual report on the working of the Child Welfare Scheme*, 1922-24.

(6) *Medical Research Council, Child Life Investigations. Maternal syphilis as a cause of death of the fœtus and new born child.* By J. M. Cruickshank, 1924.

(7) *Medical Research Council, Child Life Investigations. The effect of maternal social conditions and nutrition upon birth weight and birth length.* By M. Bruce Murray, 1924.

Current Topics.

A Report by Lieutenant-Colonel J. D. Graham, C.I.E., M.B., I.M.S., Public Health Commissioner with the Government of India and Representative of the Government of India on the Session of the Office International d'Hygiene Publique, Paris, April—May 1927.

Eight meetings of the Plenary Committee were held between Monday, April 25th and Monday, May 2nd, inclusive. Delegates were, however, summoned to attend on Saturday, April 23rd, at 10 a.m., and sit in commission to examine drafts and discuss details of "projects d'accord," which it might be possible to arrange with any of the regional Epidemiological Bureaux.

Monsieur Velghe (Belgium) presided, and the permanent secretariat of the "Office" were all present, as also the Medical Director and Deputy Director of the Health Section of the League of Nations (Dr. Rajchman and Dr. Norman White).

Thirty-four delegates were present from Australia; Belgium; Denmark; Spain; United States of America; France; French West Africa; Indo-China; Great Britain; India; Greece; Italy; Japan; Luxemburg; Morocco; Monaco; Norway; New Zealand; Netherlands; Netherlands' East Indies; Peru; Persia; Poland; Portugal; Roumania; Kingdom of Serbs, Croats and Slovenes; Sweden; Switzerland; Czecho-Slovakia; Tunis; Turkey; Union of South Africa; Uruguay; Union of the Soviet Socialist Republics.

I.—*General.*

Before crossing to Paris, I was able to arrange with the India Office for the translation and multiplication of the various notes which I presented on behalf of Indian workers; and in this I received every assistance from the India Office staff concerned.

As in former sessions, the items of the agenda were not discussed seriatim, but as opportunity and convenience dictated, the communications regarding epidemiology being relegated to the last two days.

II.—*Presidential and Secretarial Remarks.*

The President opened the Session by welcoming the new delegates. He also referred to the presence by

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invitatfon of Major Thomson of the Egyptian Sanitary Maritime and Quarantine Board, and to the recent death of Dr. Gouzien of the French Army Department.

The Director (Dr. Pottevin) read various official communications dealing with:

(*a*) Correspondence in connection with Article 7 of the Convention and its application, in accordance with instructions given to him at the October 1926 Session.

(*b*) A communication from the Government of Australia regarding the Melbourne Conference, its objects and its results.

(*c*) Treatment of venereal disease among seamen, and declarations in this connection from Great Britain, India, South Africa, Sweden and France.

(*d*) Annual report of the Health Section of the League of Nations for 1926, and report of the 9th Session (February 14th, 1927), of the Health Committee of the League of Nations, which were considered in detail later.

(*e*) A Note from the Government of India regarding the adoption of the International nomenclature of diseases and causes of death.

III.—*Report of duties under Article 7 of Convention.* (Agenda, item II: discussed in Commission April 23rd, and in full Committee April 25th, *vide* Annexures. 1 to 7.)

The most important international matter on the agenda was item II, dealing with the new obligations of the Office under the Convention of 1926. In this connection the Director presented the report which he had been asked to prepare at the October 1926 Session; but, as this had a very special connection with work of the Comité in Commission on April 23rd, it will be well at this stage to give a resumé of the proceedings on that date.

Proceedings of Comité in Commission on April 23rd, 1927.

Members had been summoned by telegram, and only 27 were present. His Excellency M. Camille Barrère (France) occupied the chair, and the Committee proceeded to consider certain draft agreements regarding the work under Article 7 of the Convention, before their submission to the Plenary Committee.

As regards the League of Nations, only the question of the Singapore Bureau arose at the moment. As a result of Resolutions 8 and 9 of the 9th Session of the Health Committee of the League of Nations (February 14th, 1927), the Director presented a "text" which had been entrusted to him to prepare. It was in two documents, one dealing with Resolution 8, and one with Resolution 9, and had been modified considerably as the result of several meetings with the representatives of Great Britain, the United States of America and the League of Nations Health Committee. The final text seemed to be quite suitable, and was discussed at 3 p.m., when M. Velghe (Belgium) was in the chair. After careful consideration the general text was adopted unanimously; that for the Singapore Bureau was also adopted after certain corrections had been made, and after Dr. Tsurumi had been satisfied regarding the reasons for omitting Article 3, and Colonel James regarding his suggestion to omit Article 2.

The report presented by the Director embodied the above agreement reached by the Comité in commission and the points were considered in the same order.

(*a*) *Pan-American Bureau.*—After Dr. Mimbela (Peru) and Sir G. Buchanan (Great Britain) had spoken on various aspects of this, the Comité agreed to thank Surgeon-General Cumming (U. S. A.) for his letter, and to apply to him after the Lima Conference for the final "project."

(*b*) *Singapore Bureau.*—The draft General Agreement and that for Singapore were read. The former was adopted without comment, the latter after considerable discussion. This was initiated by Lieutenant-Colonel James (New Zealand), who elicited the assurance that the "Office" was unfettered and free to examine and publish anything in future—in other words, that the present arrangement was not limitative. The Director did not think, in spite of what Sir G. Buchanan said, that there was at present any need for an "Office" weekly bulletin, and this position was agreed to, with the reservation that the "Office" retained full liberty in regard to publishing such a bulletin. Dr. Rajchman's attitude in perhaps throwing over the "Office" publication work, should the "Office" commence to publish a weekly bulletin, was raised; but agreement followed and the draft was adopted.

IV.—*Resolution IV of the 9th Session of the Health Committee of the League of Nations.*

A revised text had been drafted in London in a meeting attended by Sir G. Buchanan, Dr. Pottevin, Lieutenant-Colonel James, Dr. Clarke (U. S. A.) and myself on 13th April; but, in consultation with Dr. Rajchman, a final redraft had been prepared which was more general, less cumbersome and better. It was read by the Director and, after minor corrections at the instance of M. de Navailles (France), it was adopted.

V.—*Annual Report for 1926, and the Resolutions of the 9th Session of the Health Committee of the League of Nations.*

Re. Resolution IX (*ii*): Sir G. Buchanan raised certain questions about the procedure of the Singapore Bureau in notifying the movements of infected ships. He said that, after conversation with myself, he was satisfied that it would not interfere with port to port notification of such ships, and was of definite value. Dr. Rajchman spoke to its attested value, and said he would communicate Sir George's remarks to the Health Committee.

VI.—*Further consideration of the new obligations of the "Office" under the Convention, and of the work of the Sub-Committee appointed in October 1926 to examine it.*

Lieutenant-Colonel James, as a member of this Sub-Committee, read a note in which he explained the telegraphic implications, suggested that much of the Sub-Committee's work was the Director's work, and asked for experts to be added to the Sub-Committee if it was considered advisable to pursue the implications; but the Director did not think this necessary. Sir George Buchanan said that, in the Annual Note which Great Britain would, in future, furnish to the Year Book, it would be possible to give a digest of the present system in vogue at the Ministry of Health, and to place their experience at the disposal of the "Office." The Director explained that, under the arrangements now contemplated, the Pan-American and Singapore Bureaux would have to meet much of the telegraphic costs.

VII.—*Melbourne Conference.*

Dr. Park (Australia) introduced the report and resolutions of this Conference; and Dr. Jitta, who is now "Rapporteur" for the Far East, asked if Australia would be likely to agree to the recent arrangement for using the Singapore Bureau, and would make use of it. Dr. Park had replied through the Secretary-General that the Singapore Bureau would not be interfered with, that certain area diseases would be reported to the Commonwealth Director-General of Health, that, though none of the conventional diseases existed at present, Singapore would receive any such notifications and be kept in touch with such cases. Dr. Jitta thanked Dr. Park and expressed satisfaction at the proposed arrangements, and Dr. Rajchman quoted Dr. Cumpston's wire to the Singapore Advisory Council in January last, and Dr. Norman White's opinion that Dr. Cumpston desired to continue to support the Singapore Bureau in as active a manner as possible. Sir George Buchanan gave his impressions.

VIII.—*Free venereal treatment for sailors.*

After an exposition in detail by Sir G. Buchanan of the position in Great Britain, and by Dr. Park of that in Australia, I said that "detailed information regarding the treatment rendered at Indian ports to seamen suffering from venereal disease has been called for from the local Governments; but it has not been received in time for this meeting. The Government of India had, however, received in March last a report on the subject

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——, M.D., Cavendish Square, London, W.1, June 2, 1922.

"The claims made for this new intestinal disinfectant are put forward on the favourable clinical experience of specialists in this country and in the United States . . . Examination for phenol in the urine, after a week's course of treatment, gives a negative result. Tests made for us confirm a co-efficient of 35·0, and the freedom from toxicity claimed by the manufacturers."

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"The Lancet," February 24, 1923, p. 382.

"I have had a further opportunity of testing Dimol in a case of bacillary dysentery, and the result far exceeded my hopes or expectations. Within forty-eight hours the frequent stools stopped, and all symptoms have now disappeared."

——, M.D. (Glas.), Glasgow, October 11, 1921.

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——, F.R.C.S. (Ed.), Brook Street, London, W.1, September 26, 1921.

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from the delegates of the British Social Hygiene Council who recently visited India, and they are now in consultation with local Governments as to what action, if any, is necessary to meet any pertinent recommendations. Government of India have not at present been able to adhere to the Brussels agreement."

The delegates of Greece, Spain, Russia, Jugoslavia and United States of America, without circulating any papers, gave a brief resumé of the position of their respective countries in this matter.

IX.—*Ship's Surgeons.*

Dr. Lutrario (Italy) introduced this, and was followed by Dr. Tsurumi (Japan), who referred to the Red Cross League's examination of this question with that of standardisation of medicines, wireless consultations, etc. Dr. Alfaro's note was read, but not circulated, and the delegates for Spain, Netherlands, Soviet Republic, United States of America, Jugoslavia and Greece gave short notes, none of which were circulated. Dr. Park (Australia) circulated a note; while Sir G. Buchanan advocated a slow policy with more national information, Dr. Gram (Norway) desired Red Cross co-operation with the "Office," Dr. Kling (Sweden) supported him, and Dr. Lutrario replied.

The President summed up the discussion, and it was finally agreed that the Director should communicate with the Red Cross organisation with a view to collaboration and co-ordination of effort of any work it had already done, on international lines, on recruitment and standards of qualification of doctors, and on any other relevant points, such as quarantine.

The committee agreed to pursue the matter further and asked Major Thomson to furnish a detailed report of the "project" at the next Session.

X.—*Creation of a regional Bureau for the Middle East under the control of the Egyptian Maritime Sanitary and Quarantine Board.*

The President of the Board (Major Thomson), who was present by invitation, read a note in which he suggested the creation of a regional bureau for the Pilgrim area of Arabia, the Red Sea Littoral, Syria, Palestine, Iraq and Aden.

XI.—*Report of the Sub-Committee on (a) Deratisation and Deratisation Exemption Certificates, (b) Signals, (c) Wireless.*

The report of the sub-committee was read. It was divided into three parts—

(*a*) *Part I (Deratisation) with proforma.*—Some minor alterations were made at the instance of the U. S. A. Dr. Jorge (Portugal) thought the form was too detailed: but this was generally opposed. As Sir George Buchanan made some reservations regarding the maintenance of a diminution of the rat population and the criterion of exemption, the President remarked that it was "maintenance of reduction" and not "reduction solely." Dr. Tsurumi (Japan) asked if it would be officially submitted to Governments and was told it would: but that it must be considered as a "modèle obligator." To the "observations" was added the words "et maintenues" after "étaient prises" and the form was adopted.

(*b*) *Part II (Signals).*—All the difficulties of the sub-committee regarding Flag "I" recurred, and, after a long discussion with Sir G. Buchanan, the Director, Dr. Jitta, Dr. Clarke, the words "sans vouloir, etc." were added to the corrected copy which was adopted.

(*c*) *Part III (Wireless).*—This was adopted.

XII.—*Rules regarding Therapeutic substances.*

(*a*) Dr. Lutrario read the Italian decree of 25th November, 1926 dealing with sera, vaccines and auto-vaccines.

(*b*) A copy of the laws on the subject in Uruguay was presented by Dr. Etchepare.

(*c*) Sir G. Buchanan gave a resumé in considerable detail of the British Laws which have been published and which it is proposed to bring into force from 6th August, 1927.

XIII.—*Terminal Disinfection.*

In the absence of Dr. Chagas (Brazil), who apparently had been collecting the bulk of the papers, Dr. Lutrario (Italy) stated that much information had been gathered and was being sifted. Certain countries in recent legislation had shown signs of envisaging some of the principles for which Dr. Chagas contended. Further communications must be awaited.

XIV.—*Tabes and General Paralysis.*

(*a*) Dr. Clark presented for the U. S. A. a paper of much interest; and Dr. Jitta spoke of the precious character of the British bibliography.

(*b*) Lieutenant-Colonel James then gave the results of his work in England. These are very striking, as they represent cures attempted by infected mosquito bites, and not by blood injection as is usually done in Holland.

Cases on which 1926 results are based.	Successes.	Unsuccessful.	Sent back cured.	Sent back relieved.
479	255	224	61	65
..	53%	47%	12%	13%

Dr. Lutrario demonstrated by a chart that, where malaria in Italy was high in incidence, paralytic diseases were low in incidence and *vice versâ.*

XV.—*International fight against Social Diseases.*

The delegate for Soviet Russia (Dr. Syssine) read a note suggesting that the "Office" should extend the scope of its activities to include those connected with social diseases. The President indicated the need for examining the suggestion very carefully, while the Director contended that they were likely to end in our entering the domain of the International Labour Bureau of the League of Nations if we agreed to take action regarding "maladies professionelles." He instanced lead, mercury, and phosphorus poisoning and the Red X campaign against tuberculosis and argued that the Comité should oppose the suggestions. Sir G. Buchanan, whilst referring to the "mysterious" nature of the communication, thought that as the "Office" was already taking wide cognisance of medical work generally, the implications might be investigated without the "Office" committing itself in any way. The Comité finally decided that Dr. Syssine should, in October next, bring up firm proposals regarding special social diseases or special points in regard to these diseases which he wished to be investigated when the whole matter could be considered very carefully and exhaustively.

XVI.—*Encephalitis Lethargica and its mental sequelæ.*

(*a*) Sir G. Buchanan's note was read by the Secretary.

(*b*) U. S. A. note was read by Dr. Pierret.

(*c*) Dr. Kling's (Sweden) note was read and his papers circulated.

(*d*) Dr. Prochazka (Czecho-Slovakia) read a paper.

(*e*) Dr. Tsurumi (Japan) read a paper.

(*f*) The Director read a paper from Dr. Simon, Chief M. O. of Perray-Vauclause.

(*g*) Dr. Johannovitch of Jugoslavia read a paper.

Drs. Kling and Jorge criticised some of Dr. Tsurumi's paper and Sir G. Buchanan replied thanking all contributors for the high standard of their contributions.

XVII.—*La Faune des Rongeurs, etc.*

(*a*) Dr. Jorge who is "rapporteur" of the sub-committee on this subject presented a general report with analysis and criticism, and mentioned the work which was being presented from India by Colonel Graham.

(*b*) U. S. A. (through Dr. Pierrot) communicated a paper.

(*c*) I introduced a paper by Dr. Mital recording work during 1926 in the United Provinces of Agra and Oudh. The resumé which I gave was as follows:—

"This work has entailed a certain amount of organisation in order to maintain the steady supply, over a period

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of sixteen months, of fleas from all parts of the Province. From the material gathered the only conclusion to be drawn is that no proof has been adduced that *astia* is not a carrier of plague. *Cheopis* appears to be very prevalent in districts where the level of the sub-soil water is high and where there is therefore considerable ground humidity. Ground humidity varies very greatly in villages and towns a few miles apart, as some are situated on alluvial soil, others on clay beds, others are kankar beds, and others on sandy soil. These facts have been noticed in villages close together in the same district. The ground humidity in a village built on *kankar* or on sandy soil would be very low compared with that of a village built on clay or alluvial soil. This may account for the patchy distribution of *astia* and *cheopis*.

"The absence of *astia* in the hills is striking, as is also the absence of endemic and epidemic plague in these areas. It is also striking that *cheopis* is practically absent from Etawah district, while plague is often prevalent in that district.

"It is striking that *astia* are present in large numbers in Bundelkund where the soil is mostly dry and sandy and consists of small rocky hills, while plague is never endemic in these districts and epidemics are short-lived. Temperature, except when high, seems to have little influence on the prevalence of epidemics, as the temperature of the hills in spring would appear to be eminently suitable for the spread of plague.

"To arrive at definite conclusions, transmission experiments are necessary, and have been going on under Dr. Amar Nath Goyle since September 1st, 1926." (Colonel Dunn's note.)

(*d*) Dr. Stock presented a note regarding South Africa. A desire was expressed by Dr. Jorge and Dr. Pottevin to have access to the entomological bases on which the different classifications were made. I agreed to send this to both delegates in so far as it referred to the work in British India.

XVIII.—*Beriberi.*

In introducing Colonel McCarrison's work I spoke as follows:

"In view of the recent publication by the League of Nations of Professor Saiki's work, some account of similar work by Lieutenant-Colonel McCarrison, I.M.S., under the Indian Research Fund Association will be of interest. The following note by this well-known worker on some of the problems he is engaged on at the moment at Conoor in South India deals with four different aspects of this work.

(*a*) Beriberi and its experimental production.

(*b*) Stone-in-the-bladder and its experimental production.

(*c*) A new type of goitre and its experimental production.

(*d*) The relation of iodine to the chronic hypertrophic or adenoparenchymatous type of endemic goitre.

In connection with item (*a*) I have placed on the wall a diagram showing graphically the conditions under which Lieutenant-Colonel McCarrison is able to produce at will beriberi or polyneuritis columbarum, and to prevent them from developing. This will repay careful study. The series of papers embodying this work will be found in the publications of the *Indian Journal of Medical Research*."

Other notes by the same author on experimental calculus and experimental goitre with photographs were circulated for information.

XIX.—*Cholera.*

In presenting my note on the cholera research work in India during 1926-27, I said that a very considerable amount of research and experimental work on cholera is now in progress in India under Provincial Governments, the Government of India, and the Indian Research Fund Association. A glance at the tabular statement shows that work on epidemiology, bacteriology, geographical distribution, treatment and prevention of cholera is in progress in the three cholera provinces of Madras, Bengal, and the United Provinces of Agra and Oudh.

Lieutenant-Colonel Russell's work in Madras is certain to prove very valuable. His careful statistical control of the bilivaccine experimental work is especially valuable and has been elaborated in the paper circulated. This aspect of the work is being investigated in Bengal by Dr. Tomb, Captain Maitra and by Dr. Brahmachari, and in the United Provinces under Lieutenant-Colonel Dunn. The evidence seems to indicate that this one method is of value; but further figures in proof of this are awaited.

The results of the work now done or in progress will be published in due course in the *Indian Journal of Medical Research* and in the *Indian Medical Gazette;* but full notes of this work have been circulated for information.

CHOLERA (RESEARCH AND EXPERIMENT).

A.—*Madras.*—	
(1) Bilivaccine.	Lieut.-Col. Russell.
(2) Epidemiology.	
(3) Geographical survey.	
B.—*Bengal.*—	
(1) Research and bilivaccine experiments (with resumé).	Dr. Tomb.
(2) Research and bilivaccine experiments.	Dr. Brahmachari.
C.—*United Provinces.*—	
(1) Research.	Dr. Saranjam Khan.
(2) Bilivaccine experiment.	

I then gave a resumé of the different notes referred to which met with a very favourable reception. The President at once voted this a very important contribution which would require careful study, if necessary, at the next session, as it raised new issues in regard to cholera. As its importance almost prohibited casual discussion the Director hoped it might be possible in future to receive such communications well in advance of the meeting—say 2 months before it. Sir G. Buchanan at my request, pointed out the difficulties in doing this, my probable absence in October next, and the fact that I was giving the Comité up to date information regarding this work in India in view of their anxieties in this direction a year and a half ago. Dr. Carriere and the U. S. A. Delegate desired an "Office" resumé and Dr. de Vogel was assured that any "2 months" rule could always be suspended in a special case. Dr. Lutrario thought it would be difficult to work in practice. The Director discussed certain conclusions in Dr. Tomb's paper, and it was finally agreed that the whole question be placed on the agenda for fuller discussion in October 1927, and, if necessary, in April 1928.

XX.—*Yellow Fever.*

Dr. Audibert (French Indo-China) read a communication on Yellow Fever in Senegal.

XXI.—*Small-pox and Vaccination.*

(*a*) U. S. A. presented a paper.

(*b*) Dr. Chodske (Poland), paper on the first 2 cases of post-vaccinal encephalitis observed in Poland.

XXII.—*Plague.*

In presenting my note on plague I dealt with the 1926 incidence, with forecasting of epidemics and with research, and said—

"I. During 1926 the position in All-India with regard to the three great infectious diseases of India, *i.e.*, cholera, plague and small-pox, was as follows:

(*a*) *Cholera.*—The total known attacks and deaths were less by 7,525 and 2,640, repectively, than in 1925.

(*b*) *Plague.*—The total known attacks and deaths were greater by 70,745 and 47,442, respectively, in 1926 than in 1925.

(*c*) *Smallpox.*—The total known attacks and deaths were greater by 46,881 and 14,115, respectively, in 1926 than in 1925.

II. Resumé of note by Director of Public Health, Punjab, on the forecasting of plague epidemics in the Punjab.

Lieutenant-Colonel Forster, I.M.S., Director of Public Health, Punjab, has written a short paper which I have

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had translated and circulated. It deals with the forecasting of plague epidemics in the Punjab.

After showing the need for such forecasts, both from the public health and the economic points of view, he explains how he has been able to arrive at his deductions.

Briefly he advances the proposition that, if plague, instead of increasing month by month from August till April, experiences a set back in December, evidenced by a step down of the seasonal curve in that month, this set back is the reflection of a very important occurrence in the rat flea plague cycle.

He summarises his deductions under eight paragraphs which will be found at the end of the translated note.

III. Programme of plague researches under the Indian Research Fund Association during 1926-27.

(1) *Plague Research in the United Provinces.*—This inquiry had for its object the determination of the relative seasonal efficiency of *X. cheopis* and *X. astia* as vectors of plague under the climatic conditions of the United Provinces.

(2) *Plague researches at the Haffkine Institute, Bombay.*—The treatment of plague will be studied in rabbits and rats; mercurochrome will be tried, and the serum treatment of plague in rabbits will be carried out.

(3) *Anti-plague Vaccine Inquiry.*—Attempts will be made to intensify the growth of plague in the broth by buffering the media and by having the media in an atmosphere which will tend to maintain its reaction at a constant level.

IV. The Plague Research Officer, U. P., writing on 26th February 1927, says:—

'Since my last quarterly report in the beginning of December 1926, many more transmission experiments have been carried out with *astia* and *cheopis*. The results of these experiments have further confirmed the opinion expressed in the last report that *astia* appears to carry plague less readily to rats than *cheopis*. In all, 23 experiments have been made with Jhansi rats, out of which 15 were successful with *cheopis*, and only 6 with *astia*. With Madras rats, too, a similar difference in the power of these two species of fleas to carry plague has been observed, for out of 15 experiments in which *astia* was used, a successful transmission occurred in 3, while under parallel conditions 8 out of 15 experiments with *cheopis* were successful. Males of both the species appear to transmit plague more readily than females under laboratory conditions.

We were confronted with many difficulties in our experiments at Dehra Dun. The chief difficulty was to maintain a continuous supply of *astia* at Dehra Dun, where *astia* does not exist at all. Sometimes the supply of rats in Lucknow failed and they were unable to send *astia* to Dehra Dun. At first when the fleas were sent from Lucknow, most of them were either dead or in a hopeless condition when they reached Dehra Dun. This difficulty was overcome by packing the fleas in a specimen tube containing a swab of cotton wool soaked in rat's blood. Five complete experiments were made at Dehra Dun, out of which one was successful with *cheopis* and one with *astia*. We are now conducting experiments at Jhansi, and the results will be reported later.

Continuous transmission experiments in breeding cages have yielded similar results. One continuous transmission experiment was begun on the 19th of December, 1926, and it lasted till the 18th of February, 1927. During this time continuous transmission was obtained with 7 rats in the *cheopis* cage and with only two in the *astia* cage. The climatic conditions under which continuous transmission can be obtained in breeding cages with the respective fleas are being studied.

The time of the survival of the fleas apart from their host is a matter of great importance from the epidemiological point of view, and this point is being investigated. It was found that the females of both of the species live much longer than males. Female *astia* has a shorter life than female *cheopis*. The observations are too few to arrive at any conclusions with regard to the influence of temperature and humidity upon the longevity of the fleas.

Experiments are being carried out in the two godowns which have been recently built. The results of these experiments will be reported later on.'"

XXIII.—*Opium.*

As I was a member of the sub-committee dealing with opium and which met at 2 p.m., on the 26th April, I have given in the Appendix as Annexure 39, a resumé of its proceedings. The report of the sub-committee was read by Dr. Carriere, and, after minor alterations, it was agreed to.

XXIV.—*Scarlatina.*

(*a*) The U. S. A. report was read and Dr. Madsen (Denmark) added that already his standardisation committee was arranging to standardise this antitoxin with Doctors Dale, McCoy, Huschfold of Warsaw, and himself.

XXV.—*Relapsing Fever.*

(*a*) U. S. A. note was read.

(*b*) Dr. Pulido read a note on relapsing fever in Spain.

XXVI.—*Cancer.*

(*a*) U. S. A. note was read.

(*b*) Dr. Lutrario read a note, and showed and explained drawings and plans of a new cancer institute in Italy.

(*c*) Dr. de Vogel read a note explaining the nature of the comparative study of cancer in different races which has been in progress for two years in the Dutch East Indies.

Sir G. Buchanan congratulated the contributors and said that he would indicate to the Director two or three points on which he wanted further information.

XXVII.—*Kala-azar.*

(*a*) I presented a note on the work done by the Commission and by the School of Tropical Medicine, Calcutta, on kala-azar during 1926. I also showed a collection of the Commission's photos and drawings, and distributed a copy of the special Kala-azar Memoir of the Indian Research Fund Association to every delegate.

I spoke as follows:—

"In view of the importance of the work done by the Kala-azar Commission I have much pleasure in presenting to each delegate a copy of the special Kala-azar Memoir published by the *Indian Journal of Medical Research.*

This presents in an easily accessible form much of the most important work done by the commission, and will be found to be of much use for reference.

A.—*Resumé of the work of the Kala-azar Commission.*

(1) The life-history of *L. donovani* in the sandfly *P. argentipes* has been fully worked out. It has been shown that development of the flagellate phase of the parasites takes place uninterruptedly until a massive infection extending throughout the whole length of the pharynx and buccal cavity of the fly is present and the flagellates are protruding from the mouth proper of the fly. Under these conditions it is inconceivable that the flagellates should not gain access to the wound made by the bite of the fly.

(2) The Commission has determined that the flagellate phase of *L. donovani*, without the presence of the rounded aflagellate forms found in old cultures, is infective. Some evidence has also been obtained that the latter phase is a degeneration product and incapable of producing infection. The morphology, and mode of formation of the aflagellate forms has been fully studied.

(3) *Triatoma* (*Conorhinus*) *rubrofasciata* has been definitely excluded from the list of possible vectors of kala-azar.

(4) The forms of *L. donovani* found in infected sandflies have been proved to be infective when inoculated intra-peritoneally.

(5) *P. argentipes* has been found in nature infected with *L. donovani*, thus furnishing one more link in the chain of incriminating evidence against this insect.

(6) Attempts to bring about transmission of kala-azar to experimental animals by the bite of *P. argentipes* have so far been unsuccessful, although a very large number of experiments has been carried out.

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(7) Microscopical sections have been cut of *P. argentipes* fixed *in situ* in the act of feeding on mice. These sections show the presence in the neighbourhood of the proboscis, in the wound made by that organ, of bodies resembling the forms of *L. donovani* present in the buccal cavity of the fly. The confirmation of this finding would prove the actual transmission by the fly of flagellates to the wound made in feeding, apart from the question of whether these flagellates were capable of producing infection in the mouse.

B.—*Resumé of the work of the Kala-azar Research Department, Calcutta School of Tropical Medicine and Hygiene (Partly financed by the Indian Research Fund Association).*

Work in connection with the kala-azar transmission problem.—Survey work was carried out in a rural area near Calcutta in order to study the conditions which are especially favourable to the spread of kala-azar in rural areas. The villages showed an infection rate varying between 1 and 17 per cent.

101,000 sandflies (*P. argentipes*) were bred in the laboratory for the purpose of transmission experiments.

About 2,000 infected sandflies were fed on susceptible laboratory animals, white mice, hamsters and monkeys, and a number on volunteers, but up to the present the infection has not been transmitted in this way.

Parallel feeding experiments were carried out with two species of sandfly, *Phlebotomus argentipes* and *Phlebotomus papatasii;* after feeding on the same kala-azar patients, 42 per cent. of the former and 2 per cent. of the latter became infected..

A number of infection experiments were carried out with white mice; it was found that young cultures of leishmania will infect mice if sufficient material be injected, and it was concluded that the previous failure of the Kala-azar Commission to cause infection with young cultures was due to the paucity of the material used and not to the age of the culture.

Treatment.—A number of pentavalent compounds were given a further trial in the treatment of kala-azar.

Stibamine glucoside (Neostam) was used in 45 cases; a comparative study of the therapeutic value of batches with different relative toxicities was made.

Aminostiburea was used in 36 cases; this compound was found of considerable value in the treatment of resistant cases.

Novostiburea was given a thorough trial and was found to be of considerably less value than other pentavalent compounds.

Satisfactory results were obtained in 45 cases in which urea-stibamine (Stiburea) was used.

The most satisfactory results have been obtained with another pentavalent compound of antimony, von Heyden 693. Up to the present 61 patients have been treated without a single death occurring in this series. In the earlier cases more injections were given, but recently the routine treatment was a total dose of 2 grammes given in 8 injections over a period of 17 days; our results uptodate indicate that at least a 95 per cent. cure rate can be anticipated after this short course of treatment. This is a great improvement over the sodium antimony tartrate treatment; with this salt the routine treatment consisted of 30 injections during a period of at least 2 months, and resulted in a 10 per cent. death-rate and a cure-rate of less than 80 per cent."

XXVIII.—*Food contamination.*

M. de Navailles proposed the creation of a "bureau des alimentaires" by the "Office" to collect information as to what countries have laws (and what they are) regulating the introduction of antiseptics into food and for detecting them at ports. Drs. Jitta, Carriere and Lutrario spoke, the latter alluding to Italy's laws regarding antiseptics and colours in foods, the documentation of which he promised to send to the Office.

XXIX.—*Papers circulated but not read.*

(1) Notes on experimentally produced calculus of the bladder and on goitre by McCarrison presented by myself.

(2) Note on Leprosy in India and the campaign under the Indian Branch of the British Empire Leprosy Relief Association.

XXX.—*Remarks.*

(*i*) It is a matter for great satisfaction that the contributions from India should be so well received. This year was no exception. The President and others, including the Director of the 'Office,' the Chairman of the Health Committee of the League and the Director of tht Health Section expressed themselves personally to me in this sense.

(*ii*) The contribution, though representative, was by no means an exhaustive one. I thought it better to confine myself to subjects with which the "Office" was specially concerned, such as research work with an epidemiological bearing, especially on the conventional diseases. The "Office" has not, however, drawn any hard and fast line regarding such contributions, and, in view of the opinion expressed in regard to the Soviet delegate's contribution on social diseases, we may expect to hear more regarding this at the next meeting.

(*iii*) The outsanding feature of the session was the agreement reached with the League of Nations regarding the rôle of the Singapore Bureau under Article 7 of the Convention; the probability of a similar agreement being reached at an early date in regard to the rôle of the Pan-American Bureau in this matter; the declaration of the proposed rôle of the Melbourne Bureau; and the Proposals for the creation of a Middle East Bureau under the Egyptian Maritime Sanitary and Quarantine Board. The *festina lente* policy advocated a year ago by the British representatives would seem to bear fruit by allowing for the adoption of matured schemes under Article 7 of the Convention.

(*iv*) One noticeable feature of the Session was the greatly increased number of contributions, especially from the United States of America.

(*v*) It will have been noted that the Comité sat on one Sunday. The fact that meetings of the Health Committee of the League and of the Conference on Rabies were occurring during the same period made work very strenuous.

XXXI. The President thanked all present, and hoped to have the conventional work in operation soon after the Convention came into force. His Excellency M. Barrere thanked him for his work. The session was adjourned till October next.

J. D. GRAHAM,
Lieut.-Colonel, I.M.S.,
Public Health Commissioner with Government of India.

LONDON,
12*th May*, 1927.

Reviews.

A MANUAL OF GENERAL MEDICAL PRACTICE.—By W. Stanley Sykes, M.A., M.B., B.Ch. (Cantab.), D.P.H. (Leeds), M.R.C.S., L.R.C.P. London: H. K. Lewis and Co., 1927. Pp. xii plus 216. Price, 7s. 6d. net.

THIS book is delightfully refreshing and stimulating: it is written by a general practitioner for general practitioners. Dr. Sykes points unerringly to the weak spot in modern medical teaching when he remarks that "most medical books are written and most lectures delivered by hospital men from the hospital point of view." To sit at the feet of droning pundits more or less out of touch with reality and try the while to assimilate the features of—Tay-Sachs' Disease, polycythæmia vera, or progressive lenticular degeneration may be a not unpleasant form of mental gymnastics, but as a preparation for the stern realities of general practice it is palpably futile. After a few remarks on the broader aspects of the subject, Dr. Sykes goes on to

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discuss the diseases which the physician is most likely to meet with in the course of his work—the remarks on the diagnosis of influenza and of appendicitis are in our opinion wholly admirable. The questions of diagnosis and of prognosis are then briefly but effectively dealt with: it comes as something of a shock to learn that the only disease that the medical man can confidently guarantee to cure is impetigo contagiosa. Other chapters which particularly held the reviewer's attention were those dealing with instruments and equipment, midwifery, and anæsthetics in general practice. It is impossible to touch even briefly on the numerous excellencies of the book: it should be read and re-read by every graduate about to enter general practice. Assimilation of the common sense precepts ought to have the double effect of removing some of his meretricious hospital omniscience and of saving him some future sleepless nights.

J. M. H.

TUBERCULOSIS: BACTERIOLOGY, PATHOLOGY AND LABORATORY DIAGNOSIS.—By E. R. Baldwin, M.D., S. A. Petroff, Ph.D. and L. V. Gardner, M.D. London: Baillière, Tindall & Cox, 1927. Pp. xvi plus 242, with 4 coloured plates and 82 figures in the text. Price, 21s. net.

This book deals with the subject of tuberculosis from a broad aspect, with the laboratory as its centre. After a historical introduction, the whole group of acid-resisting bacteria is passed in review. In the third chapter the isolation, cultivation and metabolism of the tubercle bacillus are fully dealt with.

In the following four chapters infection, histogenesis, the Koch phenomenon and immunity are fully discussed.

The pathology of the different organs occupies the tenth and eleventh chapters, which are illustrated by excellent photographs and photomicrographs.

The twelfth chapter on epidemiology is rendered clear by graphs and diagrams.

The thirteenth chapter deals with various practical aspects of prophylaxis, and the fourteenth and fifteenth with the laboratory side of diagnosis.

A discussion of tuberculin occupies the second last chapter, and the book finishes with a few pages on experimental therapy.

There is a list of references at the end of each chapter and an alphabetical index of authors at the end of the book.

This work is carefully put together, and, while it will be invaluable to all who are specialising in tuberculosis it should also be useful to pathologists who wish to have the laboratory side of tuberculosis set forth in a condensed and yet lucid form.

E. M.

OVERCOMING TUBERCULOSIS: AN ALMANAC OF RECOVERY.—By G. B. Webb, M.D. and C. T. Ryder, M.D. Third Edition. New York: Paul B. Hoeber, Inc., 1927. Pp. 81. Price, $2.00.

So many books have been written on tuberculosis that any one who can produce anything new on this subject must be counted almost a genius. This little book has reached its third edition and is deservedly popular. It is meant for the patient rather than for the doctor. Its purpose is to inspire the sufferer from tuberculosis with hope and perseverance. It recognises a fact which the doctor is too often apt to forget or neglect—that the mind has to be treated as much as the body in a chronic disease which shuts off the patient from many of the activities of life for months or even years.

The first half of the book consists of instructions to the patient. The patient is taught how to record his physical state by keeping temperature and pulse charts, and how to regulate his conduct accordingly. The importance of the patient's own efforts is emphasised. There are brief lessons on diet, fresh air and cleanliness, and instructions are given how to deal with the sputum and how to protect others. Emphasis is also laid on the importance of amusements, regular habits, and suitable climate. The accidents and complications of tuberculosis—such as digestive difficulties, nervousness, sleeplessness, sweating, pain in the chest and hæmorrhage are touched on.

The second half of the book consists of a series of charts on which the patient can record his temperature and pulse. At the head and foot of each chart is a suitable motto, proverb or other wise saying, calculated to inspire the patient with patience, courage and hope. The doctor will be sure to help his tuberculous patients by putting this little book in their hands.

E. M.

Annual Report.

BENGAL PUBLIC HEALTH REPORT FOR 1925. By Dr. C. A. BENTLEY, M. B., D. P. H., D. T. M. & H., DIRECTOR OF HEALTH, BENGAL, AND REPORTS OF THE BENGAL SANITARY BOARD AND THE CHIEF ENGINEER, PUBLIC HEALTH DEPARTMENT, FOR THE YEAR 1925. CALCUTTA, BENGAL SECRETARIAT BOOK DEPOT. PRICE, RS. 4-8.

Public health is a "transferred" subject, and should therefore be one in which the members of the Legislative Councils should take an especial interest. Yet we wonder how many of these members have a clear idea of the constitution of the Health Department of their Province, of its activities and its relations to provincial health staffs. Still fewer we fear ever read the annual health reports of the Director of Public Health. During this year there have been signs in Bengal that the Council and the public in general are taking a greater interest in public health and making some effort to realise the problems of the province. This year has seen the inauguration of a rural health staff, the extension of the Food Adulteration Act to the districts, and the fixing of standards for food stuffs in Calcutta. In the most elementary of public health duties, the registration of vital statistics, local bodies and the population generally are notoriously lax. An improvement in this direction would be a very welcome sign of which there has not yet been any evidence. There is nearly a 30 per cent. error in practically all the vital statistics of Bengal, with the exception of a few places like Calcutta and Darjeeling. The recorded birth rate and death rate for 1925 are 29.6 and 24.9 per mille respectively, though the actual figures are more probably 37.6 and 31.6. Bengal stood seventh on the list of Indian provinces as regards birth-rate and third as regards death-rate. The natural increase of population was lower in Bengal than in any province. One would hesitate to draw any particular inferences from these facts, but at present the birth and mortality trends in Bengal are approximately level.

The system of collecting vital statistics has been changed in rural areas. The *thana* officers have been relieved of these duties. So far the only noteworthy result has been that the monthly returns are unduly delayed. There is an interesting table giving the rates of mortality at various ages in Bengal, the most important source of information of the health of any place. From 10 to 15 years of age is the healthiest period in Bengal, but only half of the children born reach this age. What an unproductive waste of life and energy! Half the population are dead before reaching an age when they can be of any use to their families or to the State. An unhealthy country must therefore be a poor one, and yet there are those who seriously insist that this appalling loss of life is beneficial.

During 1925 there was less cholera and the curve trend shows that there are hopes of a steady decline in cholera mortality.

The small-pox returns are remarkable; Calcutta, the 24 Parganas, Howrah District, Hooghly and Burdwan suffered heavily, while the other districts were less

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than the 10 years mean. High time that Calcutta put its house in order in this respect. The Asansol Mines area is fortunate in being able to apply special measures.

The fever mortality in 1925 was lower than in 1924. The recorded mortality from malaria has been decreasing steadily of late years; whether this is true in actuality is doubtful. Central and Western Bengal and parts of the North are still the chief seats of malaria. The recorded mortality from kala-azar has steadily increased during the last 5 years, but facilities for diagnosis and treatment have played a great part in the apparent increase. Plague is negligible in Bengal; only 9 cases were reported in 1925. Dysentery and diarrhœa are reported as causing nearly 2 per cent. of the total mortality. In the hills, the worst months are in the rains; and in the plains these months are freest and the highest mortality from bowel diseases is in December. Phthisis is probably a serious question all over Bengal, though it is only in Calcutta that the recorded death rate (2.28 per mille) is high.

There is an interesting note on the Chittagong Hill Tracts, an out-of-the-way part of Bengal which is unfamiliar to many. An attempt is being made to improve registration in these tracts, with small success at present.

The Bengal Public Health Laboratory shows a regularly increasing output of work. Interesting notes are given on an extensive series of examinations done on tube wells in and around Calcutta. About 25 per cent. of the ghi samples submitted for analysis were adulterated and 14 per cent. of mustard oil.

Interesting research work was done on tube wells, mechanical filters, milk, *channa* and cocoanut oil.

School Hygiene and *dai* training work made definite progress. The publicity work of the department is in very capable hands and Rai Sahib K. P. Ray can point to an excellent record.

The activities of the District Health Officers are not as well known as they ought to be; they are not government servants, and their reports are therefore local. Dr. Bentley has included interesting extracts from these reports, showing the difficulties they have to contend with and the high order of work done by many despite great difficulties. The Engineering branch of the Public Health Department has an excellent record during the year and many improvements to water supplies and sewage systems were carried out.

A. D. S.

Correspondence.

SUGGESTION IN ENEURESIS.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—I have recently been reading the 'standard' authorities on the subject of disorders of micturition including eneuresis. A well-known author takes upon himself the responsibility of giving the following advice in the treatment of juvenile nocturnal incontinence: "Suggestion is to be practised on the patient; he must be told that he can stop it, and that, *if he does not endeavour to do so with all his might* (*sic*) he will be punished; or, perhaps better, that he will have to be blistered, metal bougies will have to be passed down his urethra, and electric currents used, etc."

Apart from our agreement, or otherwise, with such 'methods of barbarism,' one cannot but be surprised, at this advanced stage of psychological experimentation and research, at the failure of the distinguished author to recognise that the 'law of reversed effort' in these cases renders such treatment foredoomed to failure.

The bladder, excitable as it is, is emptied during sleep. The resultant discomfort wakens the little patient, who cries out, and is *punished* for an act which was entirely out of his control. Can injustice be carried further? A few repetitions of the cycle—incontinence, punishment, humiliation—and the *habit* is in a fair way to becoming fixed—an 'inferiority complex' being the end result.

I am tempted to refer to the subject by two cases with which I have dealt recently, and which furnish good illustrations of the subconscious control of the contractions and relaxations of unstriped muscle fibres.

A Mahommedan boy, aged 12 years, was committed by the Juvenile Court under the Children's Act to the new Remand Home at Umerkhadi, Bombay. He was reported to the matron to be in the habit of wetting his bed twice nightly. The boy passed urine in his sleep, and being uncomfortable sought a dry bed, occupied or unoccupied, in which the incontinence was repeated later on in the course of the night. The boy himself was very worried, and declared that he could not help it, as he had done it all his life, and had often been punished at home for this fault.

He was sent to me for treatment, a further remand being arranged for the purpose, and the result was gratifying and immediate. The boy slept that night, and every night for a week, without incontinence. At the end of the week, a sad little procession entered my office—the matron and two small boys, one of whom was the original patient, who had relapsed and had 'wet his bed' *once* the night before.

He was greatly distressed and very penitent. I pointed out to him that there was nothing to worry about, and that he was in a fair way to complete recovery. The second treatment cured him completely and he was in due course happily restored to his parents.

The other boy, a diminutive lad of 9 or 10 years of age, was declared by the matron to be a *badmash*.* He had run away from the Home three times, continually teased the other boys, was disobedient, and refused to pay any attention to the teacher at the Home. He was treated at the same time as his companion, and the result was—to quote the matron's own expression 'a regular miracle.' He has been a model boy since then—helpful, obedient, clean, and attentive in class, while the change in his facial expression is remarkable. Formerly he was considered by his companions to be somewhat of a *pagal* †, whereas now he is the brightest youngster in the place. His case is mentioned in parenthesis—because he was under treatment at the same time as the first boy, and to give some idea of the tremendous weapon at hand in treatment by suggestion, for the education and development of child-character.

The second case of nocturnal eneuresis to which I wish to refer was that of a Parsi youth, aged 18 years, who had had incontinence of urine *four or five times nightly since birth,* without intermission. This patient was brought to me by his father on the advice of some of my professional colleagues, under whose treatment he had been for many years. He was provided with a sheaf of prescriptions which embodied the usual gamut of medicinal preparations, official and proprietary, from the inevitable bromides, down through hyoscyamus, atropine, urinary disinfectants and sedatives, the citrates, the alkalies and acids, to the German and American synthetics; with general, constitutional and local exhibits for treatment of weak health, anæmia, digestive trouble and nervousness, which were the concomitant—or shall we say, resultant?—phenomena. It is almost unnecessary to add that the prepuce had been sacrificed in early childhood.

The parents of the youth were in great distress, as the boy was becoming 'unemployable,' and could not study or attend his lectures. The patient had a stupid 'beaten' look, and to all outward appearance was a 'mental case.'

* *Badmash* is the usual colloquial Hindustani equivalent for "rascal," or "scoundrel."

† *Pagal* means *non compos mentis.* (We add these explanations for our foreign subscribers.—EDITOR, *Indian Medical Gazette.*)

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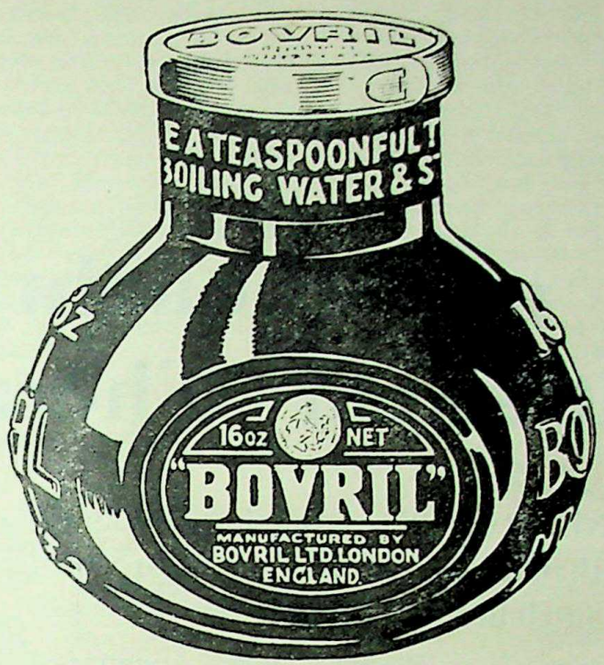

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It frequently happens in critical stages of illness that a rapid restorative is needed in order to support a patient during a period of physical exhaustion. In such crises, the well-known restorative and stimulant powers of Bovril are of great value. Bovril is the concentrated essence of beef, containing its strengthening and its nutritive properties in a form immediately assimilable and rapidly effective.

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A new thought on Intestinal Therapy

PREPONDERANCY of opinion favours the abandonment of cathartics in the treatment of constipation as they appear to contribute to its cause.

'Petrolagar' (Plain) was prepared by Deshell Laboratories in response to the demand of the medical profession for a product which would replace cathartics and plain paraffin by producing a soft, easily moved mass in the intestinal tract.

The outstanding success of Petrolagar is a tribute (by the medical profession) to its clinical efficiency.

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In dysentery or intestinal infection 'Petrolagar' (alkaline) is particularly valuable due to its alkalinity; magnesia of a colloidal nature being minutely diffused throughout the emulsion ensures a prolonged mild alkaline application. *Importance is placed upon its value as a high retention enema in a mixture of 4 ozs. Petrolagar (alkaline) with 1½ pints of water.*

'Petrolagar' is inexpensive, and it is true that, with rational diet and regular habits, it will produce definite results in constipation. To ensure best results, always prescribe 'Petrolagar.' 'Petrolagar' is a trade mark which distinguishes the fine emulsion of mineral oil and agar-agar manufactured by Deshell Laboratories, Ld., London. Apply to your nearest distributor for specimens, diet forms and literature. Smith, Stanistreet & Co., Ltd., Calcutta, or Kemp & Co., Ltd., Bombay.

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I took him in hand with great misgiving, and for three days there was no result whatever. The father was inclined to discontinue treatment; the patient himself was much discouraged, but was persuaded to persevere. On the fourth night he woke up, as I had 'suggested,' on each occasion when the bladder was about to empty itself, and succeeded in reaching the lavatory before micturition occurred, except on the first occasion when he slightly wet his pyjamas. Since then he has had no incontinence at all. He now complains of frequency of micturition. I have explained to him that his bladder has never developed, that its capacity is only a few ounces; but that there is nothing to worry about, as the organ will gradually develop to normality. He is continuing to undergo suggestion treatment to remedy this defect, but this a matter of mechanics. He is *cured*.—Yours, etc.,

W. NUNAN, M.D.,
Police Surgeon, Bombay.

BOMBAY,
1st August, 1927.

Quite recently the girl, child of a "bairagi" (beggar), aged 9 was discovered by one of the Board's staff travelling on the high road while suffering from a distinct pustular eruption which was particularly well marked on the face. In this case the date of outbreak of the eruption was readily ascertained, but the date of onset of fever could not be elicited as the guardians of the child asserted that the child had never been ill. Further enquiries revealed that this child was the second case of a series of four in the same family —details of which are given below. As no diagnosis could be made in any of these cases by means of the time-interval elapsing between the onset of fever and the outbreak of eruption—since it was asserted that none of the patients had suffered from any malaise or sickness whatever—resort was had to test vaccination of the four cases immediately after recovery. As will be seen from the appended table all the cases proved to be chicken-pox. I would draw the attention of Public Health authorities both in this country and elsewhere to this method of differential diagnosis in those very rare cases of "alstrim," "mild small-pox," and chicken-pox where there is no history of sickness or malaise, due regard being had in each case to "previous protection."—Yours, etc.,

Name of Patient.	Sex.	Age (years).	Caste.	Date of onset of fever.	Date of outbreak of eruption.	Cause.	Previous protection if any.	Date of primary or re-vaccination.	Result.
1 Sanaton Das .	M.	1½	Hindu	Nil	16-6-27	Unknown	U. P.	15-7-27	Successful in 4 points.
2 Uma Dasi ..	F.	9	Hindu	Nil	21-6-27	Contact	S. V. at age of 1 year.	2-8-27	Successful in 2 points.
3 Habu Dasi ..	F.	4	Hindu	Nil	28-6-27	Contact	S. V. at age of 1 year.	2-8-27	Successful in 1 point.
4 Putu Dasi ..	F.	30	Hindu	Nil	1-7-27	Contact	S. V. C.	2-8-27	Successful in 2 points.

U. P. Unprotected. S. V. Successfully Vaccinated. S. V. C. Successfully Vaccinated in Childhood.

J. W. TOMB, M.D., D.P.H.

ASANSOL,
17th August, 1927.

THE DIFFERENTIAL DIAGNOSIS OF SMALL-POX AND CHICKEN-POX.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—With reference to the two letters in your August issue, criticising my article on "The Differential Diagnosis of Small-pox and Chicken-pox," which appeared in your April number, in which I concluded from observation and experiment that the time-interval between the onset of fever and outbreak of eruption in the two diseases is of primary diagnostic importance, I should like to remark that while the labour resident on collieries may be considered to be more or less under medical observation, this does not hold good for the great majority of the inhabitants of the Mining Settlement who live in villages and follow occupations other than mining. The mining population of the settlement consists principally of Santhals, Kols and Bowries, who are amongst the most primitive tribes in India; yet experience has proved that these simple-minded folk, as well as the agricultural population of the settlement, are able in practically every instance to furnish the necessary information regarding fever and eruption correctly. The organisation for the immediate notification of epidemic disease which exists in the settlement assists no doubt to some extent in this regard. All the textbook points of differential diagnosis quoted by your correspondents are, I submit, notoriously unreliable in doubtful cases.

Since writing my article the differential diagnosis of a fresh series of cases of the two diseases has been verified by test vaccination of the cases immediately after recovery, and in all instances the original diagnosis has been thus confirmed.

PLASMOCHIN IN MALARIA.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—In your issue of the *Gazette* for August 1927 I find a very interesting article on "The Place of Plasmochin in the Treatment of Malaria" by Drs. Vad and Mohile of Bombay. In their series of experiments they have very carefully observed the crescenticidal effect of the new synthetic compound and have confirmed the claims made for Plasmochin in the treatment of malaria; but as the number of cases in their series is very small, being only 16, I do not think their concluding remarks that "it has no untoward or after effects" are safe to make at this stage of our knowledge about the drug. Fortunately for them there were no alarming after effects, but, as the mass of evidence quoted in this letter shows that such alarming symptoms do happen and that even death has taken place, while admitting that Plasmochin may have so many advantages over our time-honoured standby, I feel it urgent that all these alarming consequences should be brought to light before the Calcutta market is flooded with the newly discovered specific.

The facts and figures stated below are taken from the *15th Annual Report of the Medical Department of the United Fruit Company of Boston, Mass., U. S. A.* As this volume of wonderful literature, compiled by

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Dr. William E. Deeks is, I presume, by no means available to the profession at large I feel it imperative to bring to light the reported alarming consequences.

Under the general supervision of Dr. W. E. Deeks, various Medical Superintendents of the United Fruit Co. carried on experiments with Plasmochin in the various hospitals, and treated 101 cases with Plasmochin Compound and 93 cases with Plasmochin. Out of these 194 cases treated, unfavourable results from the use of Plasmochin were—

Death from toxic effect	1	(Dr. Cordes' series)
Milder toxic effect (recovered)	3	
Cyanosis	4	
Epigastric pain or cyanosis	11	
Transient hæmoglobinuria (lasting less than 24 hrs.)	1	

Among the various doctors of the United Fruit Co. was Dr. Wilhelm Cordes, M.D. (Germany), who treated 76 cases of malaria in two series of experiments, with one death reported above. His experiments were as follows:—

Drugs used in the series (36 cases in each series.)	Gametes found on the 1st day or so after admission.	Gametes found on the 8th day of treatment.	Cases positive for Gametes on the day of discharge (12th day.)
Quinine control cases.	47·2 p.c.	36·1 p.c.	30·5 p.c.
Plasmochin Compound Series.	63·8 „	2·7 „	0·0 „

Thus his findings confirm Prof. Muhlen's statement that Plasmochin has a decided influence on the gamete forms of æstivo-autumnal malaria, and that they disappeared from the peripheral blood in the majority of cases in their series from 3 to 7 days, and he thinks that Plasmochin will be an important drug in the prevention of malaria. Dr. Cordes finally concludes that, as little is known about the toxicity of Plasmochin, it is advisable that the drug be given only under strict medical supervision; but on this latter point the opinion varied greatly among the different Medical Superintendents of the U. F. C. who carried on the experiments. The following case of death which occurred in Dr. Cordes' series is copied verbatim, with the pathological findings and remarks of Dr. F. B. Malley of the Harvard University.

*A Death in a case of Malarial Fever undergoing treatment with Plasmochin."**

"The patient was a male negro, 35 years of age. He was admitted suffering from a severe attack of æstivo-autumnal malaria and was treated with the new drug, Plasmochin Compound. On the 4th day of his treatment, after fever had disappeared and the blood film was negative for malarial parasites, he developed a profound anæmia, leucocytosis, jaundice, nausea (vomiting) and somnolence. The urine was negative for hæmoglobin. He died within 48 hours of the onset of this sudden attack. The toxic influence of Plasmochin Compound was suspected to have played an important rôle in the cause of death.

Microscope Examination by Dr. F. B. Mallory, (U. F. A. 75).

Heart.—Negative.

Spleen.—Numerous lymphocytes and plasma cells in the pulp; many endothelial leucocytes in the blood sinuses containing red blood corpuscles, often in great numbers (10 to 20 and more). Malarial pigment occurred occasionally in the red blood corpuscles, both free and in phagocytes.

Liver.—Endothelial cells lining sinusoids were prominent, occasionally phagocytic, and some contained pigment. Some of the liver cells in the centres of the lobules contained vacuoles in which were dots and occasionally threads of fibrin (hydropic degeneration). Rarely a liver cell was necrotic and was being invaded by endothelial leucocytes. There was slight lymphatic infiltration of the peri-portal connective tissue.

Kidney.—Moderate œdema of tubules.

Cerebrum.—Negative.

Microscopic Diagnosis.

Malarial infection of spleen.
Marked phagocytosis of R. B. C's in spleen.
Early stage of central necrosis of liver lobules.

Remarks:—It is unfortunate that no bone-marrow was included with other tissues. The anæmia may have been due to the destruction of red blood corpuscles by the malarial infection. The phagocytosis in the spleen would seem to indicate this. The early necrosis of liver cells is probably due to the toxic action of Plasmochin, but it is not nearly so active as with chloroform or carbon tetrachloride. Possibly Plasmochin has a destructive action on the red blood corpuscles."—Yours, etc.,

D. K. L. BASU MALLIK, M.B.

CHENGALI, P. O. CHACKASI, HOWRAH.
26th August, 1927.

*(Clinical notes by Dr. Wilhelm Cordes, M.D. Germany, Preston Hospital, Cuba, c/o United Fruit Co., Boston, Mass., U. S. A.)

A CASE OF ŒDEMA FOLLOWNG CHOLERA.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—On the 4th July, 1927 I was called in to attend a patient in the coolie line on this tea garden who manifested all the clinical signs and symptoms of cholera. I placed him on a combined treatment of Tomb's essential oils mixture and potassium permanganate pills (P. D. & Co.'s 'Enteric, coated'). He showed marked improvement within 24 hours and was all right after 3 or 4 days.

He then resumed his ordinary duties, but after a few days, i.e., one week after the attack, he noticed some œdema of both his legs, then of the face. When he came to me, I found œdema present in both lower extremities, face and hands. I could not ascertain the cause of this œdema. I examined his heart, and found it normal. His urine was normal and showed no albumin. I prescribed urotropine, gr, x.b.d., and to my surprise the œdema disappeared completely after 5 or 6 days of treatment.

Can any of your readers throw any light on this case? Could the dropsy have been due to nephritis, caused by the toxins of cholera? But, if so, why was there no albuminuria?—Yours, etc.,

A. K. GHOSH, L.M.P.
Medical Officer, Ambari Tea Estate.

JALPAIGURI,
24th July, 1927.

LEECHES IN THE THROAT.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR.—There have lately been such a number of patients presenting themselves at this hospital, suffering from symptoms due to leeches in the throat, that I write to bring to notice the fact that this condition is not uncommon in India, and to enquire whether any of your readers can suggest an efficient remedy. The chief symptoms are irritation in the throat, and spitting of blood. The leech is usually concealed from view by the soft palate, or the back of the tongue. By pressing on the back of the tongue, some portion of the leech usually comes into view, and it is most easily removed with artery forceps. The leech will not normally leave the body until it is forcibly removed in this way.

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Proc. Nat. Assoc. for Prevention of Tuberculosis, 1922.

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I am informed that leeches are very prevalent in the wells in this district, and even in those with a high parapet—though such are uncommon here. The local wells are often polluted with cow-dung and dirt, whilst it is a custom for Hindu women to throw in flour into them to feed the fishes. The water is not filtered in any way before it is drunk. It is greatly to be desired that some sanitary precautions should be undertaken with reference to these wells.

Supposing that a leech of minute size gets into the stomach, will it survive? And, if so, what would be the symptoms to be expected, and the best treatment for the condition? In fact, how could it be diagnosed?—Yours, etc.,

RUDR DUTT, L.M.S.
Assistant Surgeon.

CIVIL HOSPITAL, MAILAI, MULTAN DISTRICT.
27th August, 1927.

Service Notes.

APPOINTMENTS AND TRANSFERS.

Lieutenant-Colonel A. N. Dickson, M.C., I.M.S., an Agency Surgeon, is posted as Residency Surgeon and ex-officio Vice-Consul, Bushire, with effect from the 3rd September, 1927.

The services of Lieutenant-Colonel H. Hay Thorburn, C.I.E., I.M.S., an Agency Surgeon, are placed at the disposal of the Government of India in the Department of Education, Health and Lands, with effect from the 17th October, 1927.

Lieutenant-Colonel T. C. McCombie-Young, M.D., D.P.H., I.M.S., is appointed temporarily to the Medical Research Department, with effect from the 1st September, 1927, and his services are placed at the disposal of the Director-General, Indian Medical Service, from that date.

The services of Major V. R. Mirajkar, I.M.S., are placed permanently at the disposal of the Government of the Punjab, with effect from the 18th December, 1926.

The services of the undermentioned officers of the Indian Medical Service are placed permanently at the disposal of the Government of Bombay, with effect from the dates shown against their names:—

Major M. J. Holgate, I.M.S., 19th October, 1926.
Major B. F. Eminson, I.M.S., 27th February, 1927.
Major W. C. Spackman, I.M.S., 27th February, 1927.

The services of Captain S. D. S. Greval, M.D., I.M.S., Supernumerary Officer, Central Research Institute, Kasauli, are placed temporarily at the disposal of the Government of Assam for appointment as Officiating Director, Pasteur Institute, Shillong, with effect from the date on which he assumes charge of his duties.

LEAVE.

Major R. B. Lloyd, M.B., I.M.S., Imperial Serologist, has been granted leave on average pay for 7 months, with effect from the 29th April, 1927.

PROMOTIONS.

Majors to be Lieutenant-Colonels.

D. Coutts, M.B. Dated 27th July, 1927.
R. Knowles. Dated 1st August, 1927.
R. B. S. Sewell. Dated 1st August, 1927.
J. B. Hanafin, C.I.E., F.R.C.S.I. Dated 1st August, 1927.
W. J. Simpson, M.B. Dated 1st August, 1927.
F. Stevenson, M.B. Dated 1st August, 1927.
S. H. Middleton-West, M.C., M.B. Dated 1st August, 1927.
R. S. Townsend, M.C., M.D. Dated 1st August, 1927.

Captain to be Major.

Abdul Hamid Shaikh, M.B., I.M.S. Dated 5th September, 1927.

Lieutenants to be Captains.

G. P. F. Bowers, M.B. Dated 8th January, 1927.
S. C. H. Worseldine. Dated 14th April, 1927.
M. K. Afridi, M.B. Dated 1st August, 1927.

Lieutenant to be Captain (provisional).

G. S. Chawla, M.D., I.M.S. Dated 9th August, 1927.

The undermentioned gentlemen are appointed (on probation) to the Indian Medical Service.

To be Captain.

A. J. C. Culhane. Dated 29th April, 1927.

To be Lieutenants.

S. C. Bakhle. Dated 28th February, 1927.
S. N. Evans. Dated 28th February, 1927.
E. G. Montgomery. Dated 7th March, 1927.
M. G. Kelly. Dated 7th March, 1927.
P. J. Kelly. Dated 7th March, 1927.
E. H. Sewell. Dated 7th March, 1927.
L. F. Burns. Dated 7th March, 1927.
G. F. Taylor. Dated 29th April, 1927.

RETIREMENTS.

Lieutenant-Colonel F. W. Sumner, M.D., F.R.C.S.E. Dated 25th July, 1927.

Major D. G. Cooper, M.B. Dated 1st August, 1927.

Lieutenant-Colonel L. P. Stephen, M.B., F.R.C.S.E., I.M.S., retires 4th July, 1927.

The undermentioned officer is permitted to retire from the service, subject to His Majesty's approval:—

Lieutenant-Colonel Archibald Currie MacGilchrist, M.D., I.M.S. Dated 24th May, 1927.

NOTES.

"WELLCOME" BRAND CONCENTRATED SCARLET FEVER ANTITOXIN.

AN interesting new departure in therapy is the manufacture by Messrs. Burroughs, Wellcome and Co., of a concentrated scarlet fever antitoxin. Although cases of scarlet fever are rare in this country, they do occasionally occur, and some of our readers may be interested to know that the Bombay branch of Messrs. Burroughs, Wellcome and Co., Cook's Buildings, Hornby Road, Bombay, hold a stock of 10 c.c. phials.

The following are some notes on the method of preparation and use of the new serum.

As soon as evidence became available that the serum of horses injected with the *Streptococcus scarlatinæ* and its products contained specific antitoxin, attempts were made by variants of the Banzhaf-Gibson process to concentrate the antitoxin. Progress has been somewhat hampered owing to the absence of any accurate method of testing for potency.

During the past two years Concentrated Scarlet Fever Antitoxin, prepared at the Wellcome Physiological Research Laboratories, has been under clinical test, and the various methods which were available for titrating antitoxin have continuously been under examination. These methods are (*a*) skin neutralisation, (*b*) Schultz-Charlton blanching, (*c*) the production of passive immunity, and (*d*) skin neutralisation in goats. Methods (*a*), (*b*) and (*c*) can be carried out on human volunteers only, but the greatest disadvantage is that the error in these methods of titration is much greater than in any of the accepted methods of measuring other antitoxins. Method (*d*) has not generally been accepted; with the goats hitherto available in England, satisfactory results have not been obtained.

Recently a method has been brought forward in these Laboratories which promises to give a reasonably satisfactory laboratory method of titrating antitoxin. It has been found that while normal serum, concentrated diphtheria antitoxin, etc., give no protection to rabbits which have received intravenously a lethal dose of culture of *Streptococcus scarlatinæ*, scarlet fever antitoxin will completely protect the rabbits from toxæmia. The best concentrated serum prepared by workers in America will protect rabbits when given in a dose of from 0·25 to 2 c.c.

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A corresponding level of antitoxin content has been adopted for "Wellcome" Concentrated Scarlet Fever Antitoxin.

Passive Immunity.

It has been found that 2 c.c. of some concentrated sera will turn a "Dick positive reactor" negative within 24 hours and keep the reaction negative for some days. It is probably wiser to give 4 c.c. or 5 c.c. as an immunising dose to contacts in order to obtain a sufficiently long passive immunity.

Treatment.

Until local experience has been gained in the treatment of the type prevalent, it is probably advisable, when treating severe cases, to use a liberal dosage. In the case of diphtheria antitoxin, universal agreement as to the most appropriate dosage has not yet been reached; probably some time will elapse before the dosage of scarlet fever antitoxin is generally agreed upon. Experience seems to suggest that not less than 20 c.c. should be given to severe cases, 10 c.c. where it is thought advisable to treat mild cases, and from 20 c.c. to 50 c.c. to very severe cases. The serum is given intramuscularly in ordinary cases, and intravenously in very urgent cases. In septic and particularly the late septic cases, it is doubtful if any serum at present available does much good, though occasionally encouraging results have been recorded. It would seem therefore, to be advisable, until further experience has been gained, to try antitoxin in these cases also.

WATERLESS MILK.

Dried milk as it is called in Great Britain, or *dry* milk as it is perhaps more appropriately styled in America and France, "has come increasingly into use in recent years." In a recently published textbook of public health, Professor E. W. Hope says: "Dried milk has the advantage of keeping almost indefinitely; moreover, it can be kept in the tin without infection by flies, the baby's feed only being made up at the time of use. Tubercle bacilli and other pathogenic organisms are destroyed in the process." (9th Edition, 1926, p. 112.)

We do not think it is sufficiently realised in this country that the product varies considerably in characteristics according to the method by which it is prepared. Two processes of manufacture are now in use. The first of these consists in the rapid drying of fresh milk on rollers heated by water or steam, and the subsequent powdering of the solids thus obtained with or without admixture of lactose; the second in the projection of milk in the form of a fine spray into a chamber with a current of hot dry air, so that the milk solids fall on the floor in the form of fine powder.

The powders produced by these two processes differ not only in physical characters but also in their reaction to rennet. Roller process powders, for instance, are not soluble in cold water, whereas spray powders are soluble; but the most important difference is the fact that whereas the addition of rennet to reconstituted milk prepared from the roller process produces a fine flocculent curd, its addition to a solution of spray process milk powder forms a dense mass identical with that formed in raw milk. This difference is important, for it was the character of the curd described by French writers as "just like human milk" which first led doctors to advocate the use of milk in this form for infant feeding. Another characterisitc of dried milk which has always been important is the constancy of its composition. Nothing is more notorious than the variation in the composition of the milk of one cow, but Dr. James Crowther has drawn attention to the remarkable variation in the milk of small herds as well. In a paper read at the National Milk Conference he pointed out that the variation of fat from day to day is not great in either morning or evening milk when considered separately, but as between morning and evening milk the range of variation is relatively enormous. (Cow's Milk in Infant Feeding, *British Med. Jour.*, 25th August, 1923.)

We are inclined to agree with the writer in *World's Health* last January, who described waterless milk as a godsend in the tropics and considered that much credit is due to pioneers, such as the firm of Glaxo who placed this valuable product at the disposal of the Indian practitioner more than fifteen years ago and have not only maintained the original high standard of their product but have steadily improved on it ever since.

INGRAM'S SURGICAL INDIA-RUBBER GOODS.

We have been asked to insert the following report in this column, with a note to the effect that the agents in India are Messrs. N. Powell and Co., Bombay.

A satisfactory termination has been arrived at in the legal action taken by J. G. Ingram and Son, Ltd., of the London India Rubber Works, Hackney Wick, against W. G. Ingram, a firm in Old Ford, before Mr. Justice Tomlin, in the Chancery Division, on Tuesday, June 14th. An injunction was asked for to restrain W. G. Ingram from carrying on business as manufacturers and sellers of surgical rubber goods under the name "Ingram" or "Ingram's" without taking reasonable precautions to distinguish their goods clearly from those of J. G. Ingram & Son, who deal in steam-cured goods (an expensive process). The defendant's business is of a totally different kind, dealing as they do in cold-cured rubber goods. For many years the name "Ingram" has been distinctive of the plaintiff's goods, which include hot-water bottles, enemas, sprays, gloves, syringes, belts, etc.

Reluctant as were J. G. Ingram & Son, Ltd., to engage in legal proceedings, they felt it was only fair to their customers to do so, and it is with feelings of relief and pleasure that they are able to announce that the action has terminated amicably with an undertaking on the part of W. G. Ingram, not to use on or in connection with their business in surgical rubber goods, any name or phrase containing the word "Ingram," without adequately distinguishing such business and goods from those of J. G. Ingram & Son, Ltd.

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Original Articles.

SOME OBSERVATIONS ON DYSENTERY IN PORT BLAIR, ANDAMAN ISLANDS.

By A. BAYLEY DE CASTRO,
Junior Medical Officer,
and
V. N. DEUSKAR, L.C.P.S., L.M.D.,
Haddo, Port Blair, Andaman Islands.

UNTIL recently dysentery has accounted for a fairly high percentage of the deaths in the Settlement of Port Blair, and the following notes are based upon a careful study of such cases during the past three years. The recent literature on the dysenteries in general, and on amœbic dysentery in particular, is full of interest, owing to our more recent conceptions with regard to this disease. In this article we do not aim at bringing forward new and original findings, but at an analysis of the disease as studied at Port Blair, since the recent opening of the special dysentery ward. This ward is practically self-contained, and has specially trained workers, and it is interesting to note that since its opening the number of deaths from dysentery has appreciably diminished, whilst the number of chronic cases and of cases with sequelæ have also diminished.

The cases treated during 1926 were as follows:

	Number of cases.	Number of deaths.
Amœbic dysentery	29	3
Amœbiasis (intestinal)[1]	15	2[2]
Acute bacillary dysentery	63	4
Chronic bacillary dysentery	8	2
Colitis	80	1
Diarrhœa	15	0
Acute gastro-enteritis[3]	1	1
TOTALS	211	13

Notes.—(1) By intestinal-amœbiasis is meant amœbic infection of the intestine without any symptoms of dysentery or diarrhœa.

(2) One of these was the result of hemiplegia, and the other was due to intercurrent pneumonia.

(3) Most probably an acute fulminant Shiga infection.

Tables I and II below show the comparative incidence and case mortality from amœbic and bacillary dysentery respectively in the Settlement during the years 1924-26. Table I shows the total strength of the convict population for the three years respectively, and Table II the case incidence and mortality for the same years.

This shows that 582 cases have been treated during the past three years, which figure is made up of 351 of bacillary dysentery and 231 amœbic.

The table further shows that the case mortality has definitely been on the decrease, and the fall in the incidence for the year 1926 is striking.

The amœbic infection for 1925 at first glance appears to be unduly high and a word of explanation here is necessary. More attention to the microscopic examination of stools was resorted to, and this not only in cases with dysenteric symptoms but for all diarrhœas and even apparently normal stools as well. Further, one single examination of a stool was found to be inadequate and unsatisfactory, and was replaced by eight to ten repeated examinations. It was thus that we came to realise the frequent occurrence of symptomless cases, in whom the microscope alone revealed the vegetative form of *Entamœba histolytica*, and certainly without this aid an accurate diagnosis on clinical grounds alone would have been impossible.

This experience is illustrative of the fact that amœbic infection of the gut with ulceration can continue over prolonged periods without the manifestation of symptoms or inconvenience to the patient, and is strong evidence of the necessity for use of microscope.

As it was both interesting and important to know the exact proportion of such symptomless cases, a careful record for the year 1926 was maintained, which showed that quite one-third of the total amœbic infections, or 33 per cent., were symptomless cases.

TABLE I.

Showing the Strength of Convicts.

Months.	1924.	1925.	1926
January	8,987	8,226	7,700
February	8,931	8,197	7,709
March	8,791	8,139	7,799
April	8,658	8,099	7,721
May	8,642	7,991	7,573
June	8,563	7,951	6,559
July	8,457	7,929	4,463
August	8,345	7,872	4,427
September	8,370	7,855	7,408
October	8,287	7,790	7,390
November	8,229	7,440	7,292
December	8,191	7,726	7,274

TABLE II.

Showing the case incidence and mortality from Amœbic and Bacillary Dysentery.

	1924.		1925.		1926.		T. for 3 Years.
	T. No. Cases.	% Mortality.	T. No. Cases.	% Mortality.	T. No. Cases.	% Mortality.	
Amœbic Dysentery.	79	15·19	108	11·11	44	11·36	231
Bacillary Dysentery.	162	21·60	118	16·10	71	8·45	351
TOTAL	241	36·79	226	27·21	115	19·81	582

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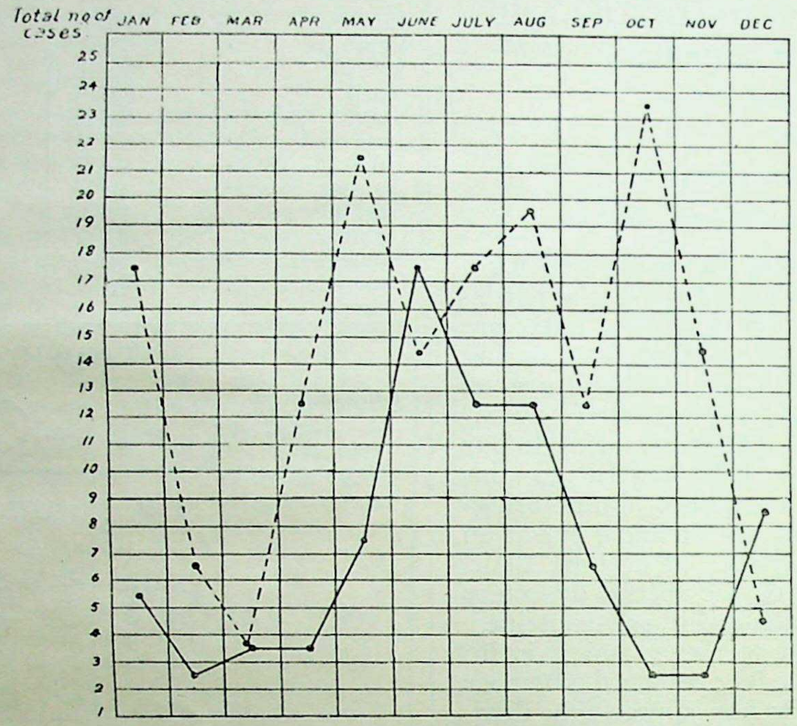
Another interesting feature is the proportion of amœbic to bacillary dysentery. It has been stated that one-fifth to one-sixth of the total cases of dysentery in India are of amœbic origin. From the study made in Port Blair for the past three years we found that quite 40 per cent. of our cases were of amœbic origin, a proportion much higher than the estimated average for India.

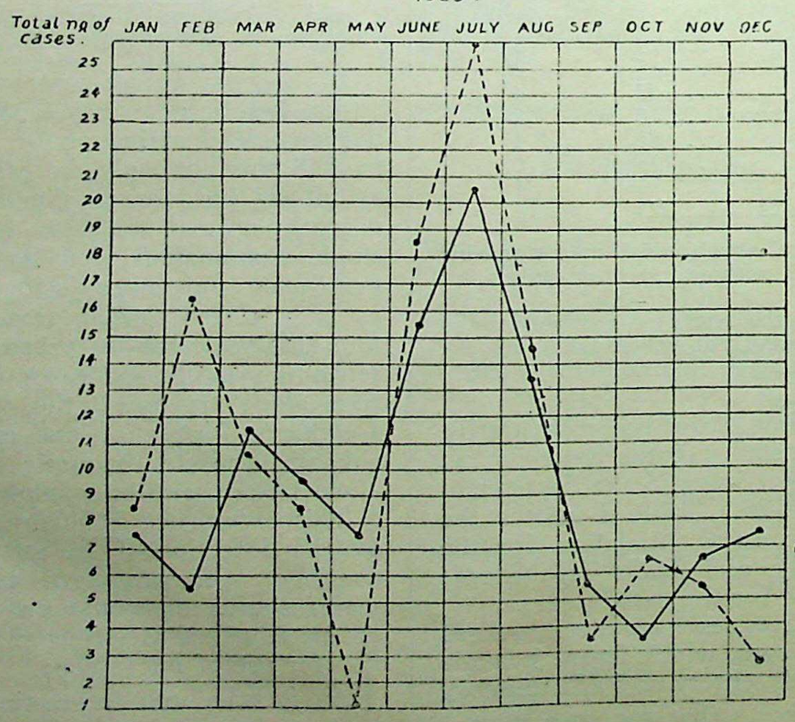
As regards the seasonal incidence, that of bacillary dysentery seems to be in accordance with what is generally accepted for the disease, and although amœbic infections are believed to have

CHART No. I.



———Amœbic Dysentery.
.....Bacillary Dysentery.

CHART No. II.



———Amœbic Dysentery.
.....Bacillary Dysentery.

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no definite relationship to any particular season, yet upon the charts appended for the years 1924-25-26 it will be observed that the seasonal curve of amœbic infection more or less corresponds with the seasonal curve of bacillary dysentery.

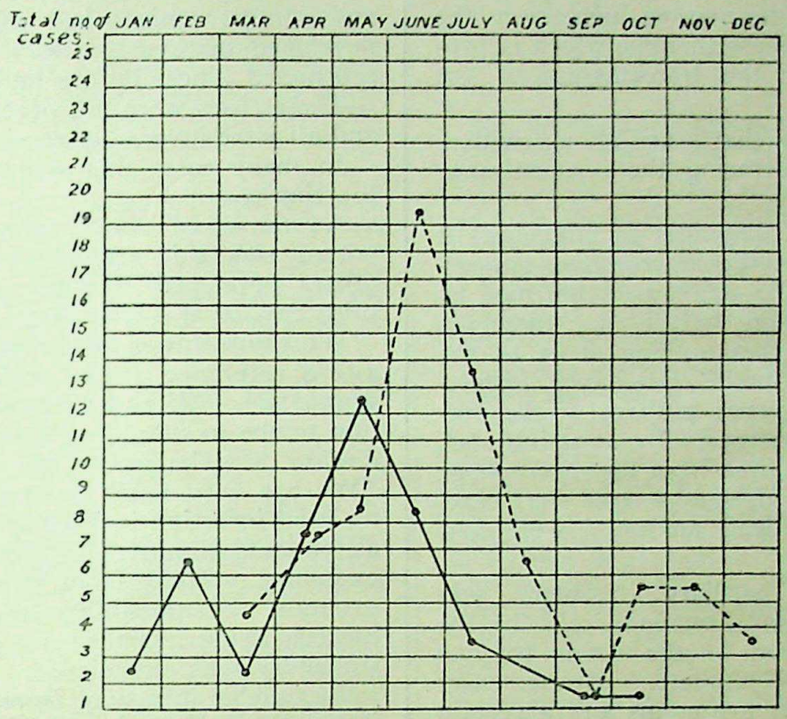
Chart I for 1924 shows the maximum height of the bacillary curve for the month of May, while that for amœbic infection is in the month of June; a second rise for bacillary dysentery is seen in October, but there is no such secondary rise for amœbic dysentery.

Chart II for the year 1925 shows the maximum height for both bacillary dysentery and amœbic dysentery to be the month of July, and shows a close resemblance of seasonal prevalence in both diseases.

In chart III for 1926 the maximum height in the case of bacillary infection is seen in the month of June, and that for amœbic in May.

CHART No. III.

1926.

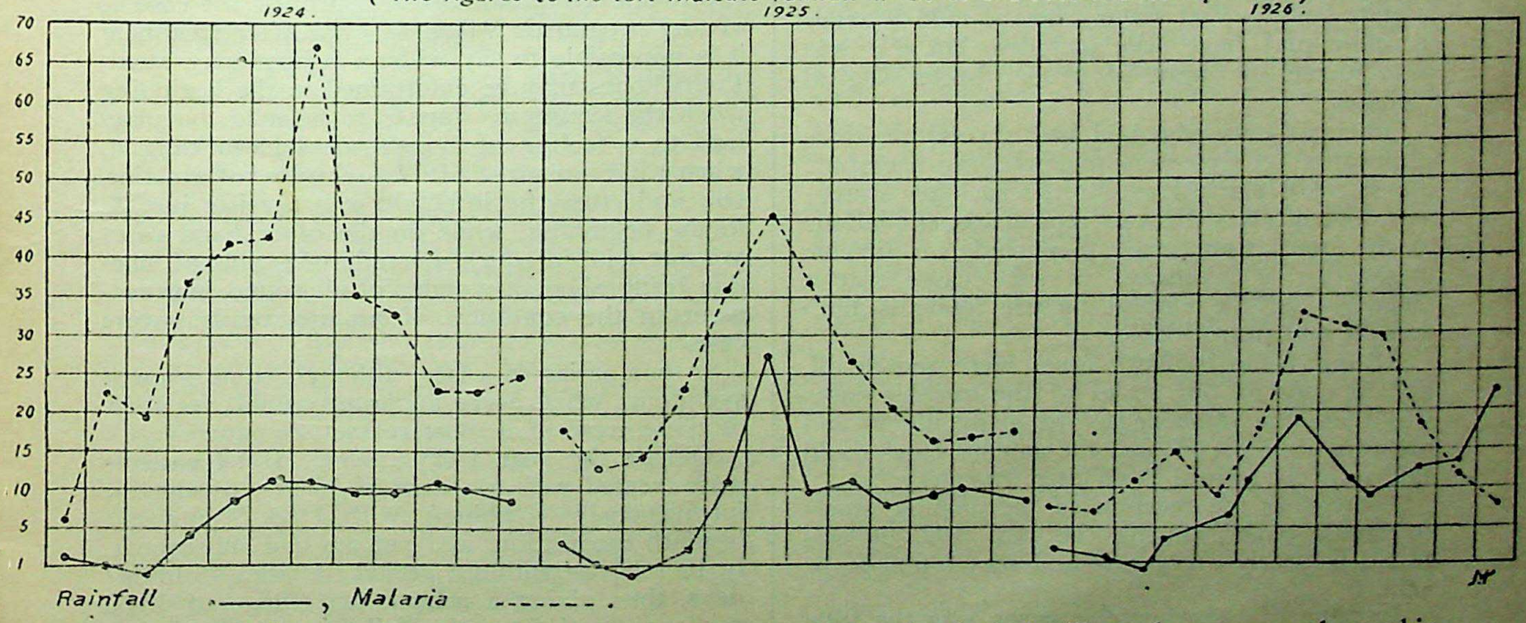


——— Amœbic Dysentery.
. . . . Bacillary Dysentery.

CHART No. IV.

MALARIA & RAINFALL.

(The figures to the left indicate rainfall in inches and rate of disease per 1000.)



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Thus it is noted that the amœbic curve reaches its maximum either before, at the same time as, or after the bacillary curve; thus also showing in the case of amœbic infections a decided tendency to seasonal prevalence similar to that for bacillary, and the only reasonable explanation for this seems to be the marked increase in the fly population during these months, which is probably responsible for the transmission of the amœbic cysts.

Malaria and rain charts are shown with a view to still further tracing the seasonal prevalence.

With regard to the diagnosis of amœbiasis it may be remarked that the macroscopic appearance of the stool was in each case confirmed by microscopic examination before the diagnosis was established, and that nothing short of the presence of actively motile *Entamœba histolytica* was accepted as proof positive of the presence of amœbic dysentery. By so doing such errors as are likely to arise from the macrophage elements of a bacillary dysentery stool were carefully avoided, and "dead amœbæ" were also dismissed.

The diagnosis of bacillary dysentery was chiefly on clinical grounds, but aided also by the microscopic examination of the stools for the presence of cellular exudate. These cases generally showed acute symptoms and a certain amount of toxæmic pyrexia, while the prostration was often extreme.

Those cases that were apyrexial and took a mild course without any appreciable prostration were diagnosed as "colitis," and in this group it is quite possible that a few cases of mild Flexner infection may have been included, but this was unavoidable for want of proper bacteriological facilities.

Other patients who had had several previous admissions for dysentery and who ran a chronic course were marked as chronic bacillary dysentery, and in all such cases repeated examinations of the stools were made to exclude an amœbic origin, for it is always in such cases that a diagnosis on the clinical picture alone is both difficult and unjustifiable.

All our acute bacillary cases were acutely ill, and in none of our series of the amœbic cases was there the same degree of acute illness and prostration seen. In fact the amœbic cases could faithfully be termed "walking dysentery."

As regards the reaction of the amœbic stools to litmus paper, during the year 1925 it was tested in nearly every case and was found to be acid.

In none of these amœbic cases was the total number of stools passed per diem more than 18, while the usual number was 8 to 12. This may lead one to believe that the infections must have been mild, but such a conclusion would be wholly fallacious. We must here make a special note on a certain prominent and frequent symptom observed, especially in the 1925 series of bacillary dysentery cases. This was œdema of the lower extremities.

This œdema did not necessarily develop in long standing, chronic and markedly debilitated patients; for instance when No. 38631 reported sick (13-7-25) he had this anasarca of both legs, and another patient had this œdema and later developed marked ascites. He ran a long and protracted illness before he finally recovered.

These cases were not necessarily fatal, but one and all were invariably received as acute cases.

In many cases this symptom had a tendency to relapse.

As remarked above when some patients reported sick this œdema was already present; others developed it after about the second or third day, or at a later date while still in hospital.

We think this is an opportune occasion to invite a reference to the malaria charts for the years 1924, 1925 and 1926, merely drawing attention to the months of greatest incidence for this disease in relation to the dysentery incidence. (We are very much alive to the importance of malarial infection in Port Blair, and the blood of all patients admitted to hospital is systematically examined. Apart from this, on careful clinical grounds the possibility of a severe malarial melæna being mistaken for or complicated with dysentery was excluded.)

In amœbic infection, from the symptoms alone it is difficult, if not impossible, to say how a particular case will progress until the effect of specific treatment is watched, and therefore it is well in such cases to give a very guarded opinion, before instituting such treatment. Further, we do not regard the symptomological aspect of the case as of any prognostic value, as even after treatment it is impossible to say when a relapse may occur. Pious hopes may be entertained in the beginning when the symptoms appear to be mild, but may lead to a feeling of hopelessness in tackling it, when after a course of 12 to 15 grs. of emetine, one finds that the infection still persists just as in the beginning, while on the other hand cases are met with in which a couple of grains of emetine bring about a wonderful all round improvement in the condition of an apparently severe case.

In our series of cases, although some showed symptoms which were apparently mild, yet some of these were of a most refractory nature.

During the year 1925 a series of 64 patients were treated with a course of 15 grs. of emetine intravenously, combined with Deeks' intensive bismuth medication, and yet we had subsequently 10 relapses within a period of from 46 to 347 days, thus giving a relapse percentage of 15.62 per cent., and from the following notes the refractory nature of some of these cases will be easily understood.

Case No. 1.—No. 47181, Barket Ali, admitted 8th May, 1926. Given a course of 12 grs. of emetine intravenously in 1-gr. doses with an interval of 3 days after the first 6 grs. In this case the vegetative forms of the *Entamœba histolytica* persisted in the stools after 11 grs. had been given.

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Case No. 2.—No. 45083, Ali, admitted on 12th April, 1926. But this patient had been in hospital in August, 1925, for amœbic dysentery and had then had a course of 15 grs. of emetine intravenously, so that now he was admitted with a relapse after 201 days. He was put through a course of 12 grs. emetine with an interval of 6 days after the first 6 grs.

Fifteen days after this course *Entamœba histolytica* were again found swarming in the stools and a course of another 6 grs. was given, but the stools still showed the vegetative forms. He was subsequently put on to 8 grs. of stovarsol by mouth daily for 10 days. The stools started to give a negative reading after the 4th day of this treatment.

Case No. 3.—No. 47095, Ramzan, admitted 6th May, 1926, was treated as Case No. 2, with 12 grs. of emetine, but with a 3-day interval instead of 6. In this case *Entamœba histolytica* were recovered from the stools 12 days after completion of the full course, and therefore a further course of 6 grs. of emetine had to be given before negative results were obtained.

Case No. 4.—No. 43091, Adhin, admitted on 13th May, 1926. In this case a total of 18 grs. of emetine had to be given with 2 intervals of 3 days each after every 6 grs. The stool examinations revealed a positive result after 11 grs. had been administered.

Case No. 5.—No. 46580, Mula Singh, admitted 21st May, 1926. In this case the stools were positive after 7 grs. of emetine, but negative readings were obtained after a 12-gr. course. Stools examined as late as the 21st February, 1927, were still negative.

Case No. 6.—This was an exceptionally heavy infection and a very serious case; No. 46367, Nga Po Chu (opium eater), admitted 6th April, 1926. In this patient stool examinations were positive after 6, 9, and 13 grs. of emetine had been injected. A 15-gr. course was therefore resorted to before negative results were obtained, but in spite of this a 10-day course of stovarsol (grs. 8 orally per day) was given afterwards.

Case No. 7.—No. 42278, Ramswamy, admitted 8th April, 1926. This patient was given a 12-gr. course with a 3-day interval. The stools were positive after 10 grs. but negative after the full course.

Case No. 8.—No. 41239, Tulşi Ram, admitted 3rd February, 1926. A 12-gr. course was given and the stools were positive after this. He was then put on pulvis ipecac, grs. 30 daily orally for a week, when the stools became negative for the motile forms of the organism, but cysts were now passed and were found in the stools for over a month.

Case No. 9.—No. 43627, Mirafzal, admitted 10th June, 1925. This was a patient transferred to Haddo from one of the out-station hospitals. He had five previous admissions for dysentery and had had a subcutaneous or intramuscular course of 12 grs. of emetine a fortnight before coming to this hospital. This case is of particular interest as he was one of the so-called "emetine-fast" cases and subsequently proved to be both "stovarsol" and "yatren-fast" also.

On arrival his stools were positive for *Entamœba histolytica* in spite of the 12-grs. course a fortnight earlier. He was put on to intravenous injections of emetine 1 gr. per day. After three such injections, he complained of giddiness and lethargy and developed tachycardia and therefore emetine had to be discarded and stovarsol substituted, 8 grs. a day orally for 10 days being given.

No benefit resulted and the stools remained as full of amœbæ as ever. On the 16th July, 1927, the patient was put on yatren, 200 c.c. of a 2 per cent. solution per rectum after a preliminary warm water enema, for 10 days. With this treatment there was distinct relief as regards abdominal discomfort, but the stools were still full of amœbæ as will be seen from the dates given below of the microscopic examinations of the stools.

Dates of Examinations.	*Results.*
12-6-25	++
14-6-25	++
19-6-25	++
21-6-25	++
24-6-25	++
21-7-25	++
29-7-25	++
5-8-25	++
11-8-25	++
28-8-25	++

The history of this patient suggests the question, does spontaneous cure occur in intestinal amœbiasis? It was noted that in this case the stools automatically became negative some days after all treatment to effect a cure had been discontinued. The patient was subsequently discharged to the post-dysentery gang under further observation for one month on the 19th September, 1925. In 1926 the patient was admitted for malaria, but examination of the stools carried out several times still gave negative results.

Case No. 10.—No. 46726, Basant Singh, admitted 3rd August, 1925. He had never suffered from diarrhœa or dysentery before. His complaints were very vague, and he was markedly debilitated. Instead of diarrhœa or dysentery he had constipation which was of a chronic nature and for which he had to be treated with cascara and aloes. The routine examinations of the stools revealed a heavy *Entamœba histolytica* infection, and he was put on a 15-gr. course of emetine intravenously with a six days interval after the first 9 grs. Even after the course there was no improvement and the stools still gave positive readings. He was next treated with stovarsol and then yatren as in the Case No. 9, but without benefit. Negative readings of the stools examinations in this case were never obtained.

From these case notes it will be obvious how difficult it is sometimes to eradicate the infection in refractory cases.

A reference to a paper entitled "A note on the use of emetine intravenously" by the junior writer which appeared in the *Indian Medical Gazette* for April 1926 may be of interest as regards the three queries made therein with regard to the therapeutic efficiency of emetine intravenously.

(*i*) Whether with this treatment (i.e., intravenous administrations), negative stool examination results are obtained earlier than with other modes of administration?

(*ii*) Whether the subsequent effects of emetine are of a more lasting nature, and should the answer to this be in the affirmative, then,

(*iii*) To what extent is the tendency to relapses cut short? Before attempting to answer these queries we wish to make it clear that our routine treatment for the 1926 series was a course of 12 grs. of emetine with a 3 days interval after the first 6 grs.—except in refractory cases where this routine was modified to suit the nature of the case as shown in the notes quoted above. After an experience of three years we now consider ourselves able enough to state that:—

1. Negative results of microscopic stool examinations are not necessarily more quickly obtained by the intravenous administration of emetine hydrochloride.

2. That, from the 1925 series which were treated with a total of 15 grs. of emetine, relapses to the extent of 15.62 per cent. resulted,

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which we consider to be in no way lower than when emetine was administered by other methods.

3. From this and from the fact that relapses occurred after from 46 to 247 days we are inclined to believe that the action of emetine administered by the intravenous route is not of a more lasting nature than by the intramusclar or subcutaneous routes. The fact that in 2 of the cases quoted above vegetative forms of *E. histolytica* reappeared 12 and 15 days after an intravenous course of 12 grs. further supports the opinion expressed.

Amongst other drugs stovarsol and yatren are the two that we had the opportunity of using, but the number of cases treated is far too small to give any definite opinion as regards their therapeutic value.

Stovarsol.—Stovarsol medication was given to 6 cases, one of these being Case No. 1 cited already, and in which it may be claimed that this drug did some appreciable good, since the stools gave negative results after 4 days' treatment, but at the same time the possibility of the accumulative action of emetine having brought about a negative reading cannot be ignored.

Another case in which such a possibility did not exist, and where stovarsol seemed to have effected a cure was No. 33326, Bhup. This patient was discharged after a full course of 12 grs. of emetine on the 5th July, 1926. On the 13th July, 1926, he was admitted with malignant tertian malaria, and as he was known to be an amœbic dysentery case his stools were subjected to examination. On the 16th July, 1926, vegetative forms of *E. histolytica* were found and he was promptly put on to stovarsol, grs. 8 a day for 10 days. After 2 days of such treatment the stool examinations were negative and continued to be so. He was further given yatren, 200 c.c. of a 2 per cent. solution *per rectum* for 10 days before being discharged from the hospital.

Two others were chronic cases who had finished their courses of emetine long before they were treated with stovarsol, and were giving negative results to stool examinations, but in whom diarrhœa had never entirely stopped and they were the subjects of frequent exacerbations.

Progressive debility and emaciation had brought about anasarca of the lower extremities, and a moderate degree of ascites.

These were hopeless cases. They were put on to 8 grs. of stovarsol daily for 10 days, and finally as they showed no improvement, on to yatren 300 c.c. of a 3 per cent. solution per rectum, but without benefit, and finally died.

Of the remaining two cases one was a refractory case cited above as Case No. VI. Here stovarsol was used after negative readings were obtained with emetine and therefore we are not in a position to judge the true effect of this drug.

The last case was a Burman patient who was a heavy opium addict. He was admitted on the 9-2-26 for benign tertian malaria; he was extremely emaciated and under-weight, his weight on admission being only 88 lbs. As no reason for this could be assigned we were greatly puzzled, but the routine examination of the stools showed *E. histolytica* present on the 23rd, 24th, and 25th February, 1926. He was immediately put on to ½ gr. emetine intravenously.

This patient as remarked was extremely debilitated, and was daily "drying up" so to say, and we did not consider him a suitable case for a full course of emetine; therefore on the 3rd March, 1926, after 2½ grs. had been given and although the stools were negative he was put on a course of stovarsol. It is a pleasure to record that this hopeless case was finally discharged from hospital on the 8th May, 1926, but we cannot say whether the credit for this goes to stovarsol, or to the careful nursing, dieting and tonics that he was given.

Yatren.—This iodine preparation was tried in 5 cases, to three of whom reference has already been made, i.e., the two fatal cases in whom no drugs brought about any improvement (Case Nos. 9 and 10 and the third one, No. 33326 Bhup) that had already benefited by stovarsol.

The remaining two cases (Nos. 41820 and 41176) were solely treated with yatren 15 grs. daily by the mouth for 10 days and they certainly recovered, as evidenced by marked relief of all troublesome symptoms and the negative reading of the stools at the end of the course of treatment.

Any opinion of a definite nature on these two drugs would be premature, as the number of patients treated has been negligibly small, and so all that we can remark is that they are certainly useful drugs. The oral method of administration also makes them simple to use, but the cost, especially of yatren, is almost prohibitive when the use of this preparation for a large number of cases is considered.

Of cases with toxic symptoms after emetine, we have had only three cases, one being the development of tachycardia and drowsiness of which mention has already been made, a second being paresis of the lower extremities in a young Pathan patient after a course of 15 grs.; and the other the development of a peripheral neuritis in a patient suffering from amœbic hepatitis who was treated with a total of 18 grs. of emetine with an interval of 15 days after the first 12 grs. which had been administered in ½-gr. doses twice daily intravenously.

Recovery in all these cases was uneventful.

A brief reference now to amœbic affections of the liver may not be out of place. In this settlement with its high amœbic incidence it is a matter of some surprise that hepatic affections of amœbic origin are extremely low.

The senior writer, who has been here more than five years, has not met with a single case of liver abscess, and of non-suppurative amœbic hepatitis the junior writer has seen one very typical case (out of hospital) in 1925. This patient had co-existing intestinal amœbiasis also

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and the response to emetine in this case was magical.

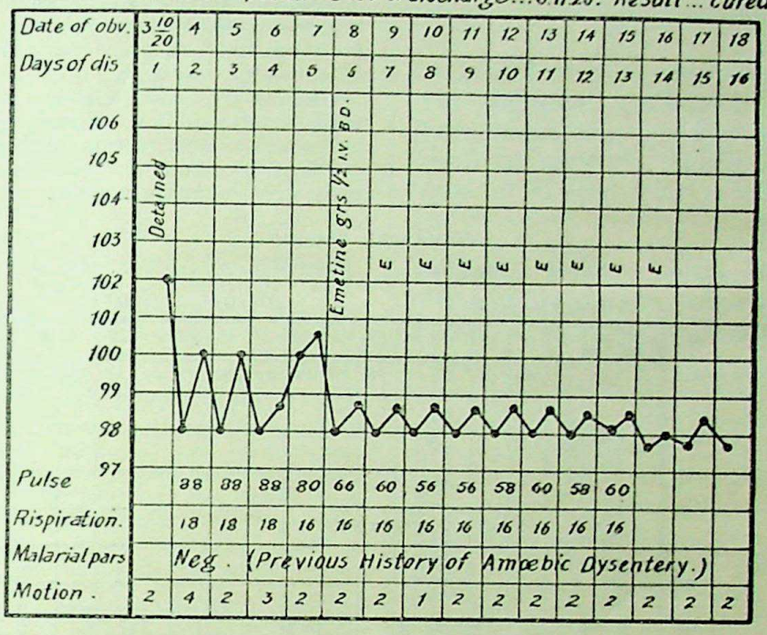
During 1926 we had three cases of non-suppurative hepatitis which were clinically diagnosed as of amœbic origin from the history of the patients.

In this low incidence of hepatic implication here the rôle played by emetine must be an important factor, but when we remember that quite 33 per cent. of intestinal infections with *E. histolytica* occur as symptomless cases, and when this is taken into account, we cannot help

HOSPITAL... HADDO.

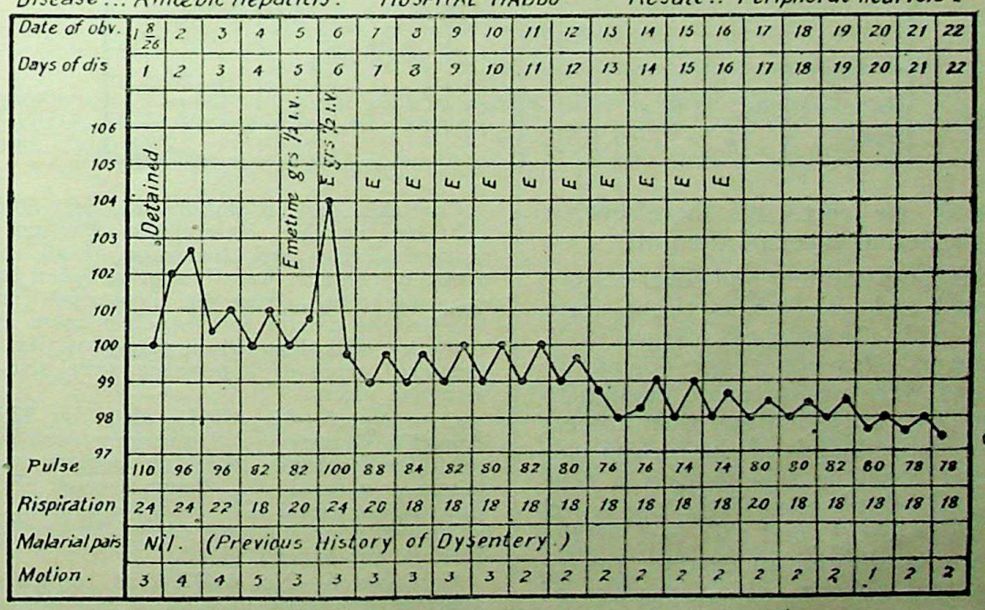
No 42672. Name... Kallaya. Date of admission.... 4.10.26.

Disease ... Amœbic Hepatitis. Date of discharge... 8.11.26. Result... cured.



No. 29744. Name.. Rambharan. Date of admission... 2 8.26. Date of discharge... 21.9.26.

Disease ... Amœbic Hepatitis. HOSPITAL HADDO Result.. Peripheral neuritis.



The temperature charts of these cases are appended as they give some idea of the temperature-controlling effect of emetine and corroborate the often-made statement that of all amœbic affections those most readily amenable to emetine are the non-suppurating inflammations of the liver.

thinking that there must be some other factor at work besides emetine that materially helps in keeping down amœbic affections of the liver.

Before concluding this article, a few remarks on the pathology as macroscopically revealed at autopsies may be of interest.

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In all cases it was invariably noticed that the ileo-cæcal valve formed the line of demarkation between the healthy and the infected bowel, and it was also noticed that the cæcum was the favourite focal centre of infection, the rugæ being in all cases affected.

The ileum, and more especially its upper part, seems to escape, and on careful investigation of the extent of damage done, the following order of infection was observed:—cæcum, ascending colon, rectum, sigmoid, hepatic, and splenic flexures, in that order.

Amœbic dysentery does not cause surface destruction as in the case of bacillary dysentery, the prime focus of infection being the submucous coat, and though some ulcers penetrate as deep as the muscularis mucosæ, they appear to stop there. In none of our cases was there ever a perforation of the serous layer of the gut.

In some of our long-standing and severe cases, areas of necrosed and gangrenous tissue were found, identical with the coloured diagram in Sir Leonard Rogers' *Dysentery* page 40, but in none of our cases were we fortunate enough to see the early miliary congestion and then abscess formation. The entire length of the rectum was the only gut that could be said to have a continuous lesion (all other areas of the big bowel being affected in patches), and this part of the infected area always showed an extreme degree of hypertrophy and fibrosis, which in some of our cases was so extreme as to reduce the lumen of the gut to the size of the finger.

With reference to the above remarks the following few *post-mortem* notes on the condition of the large intestine are recorded.

Case No. 1.—No. 46461, died on the 7th May, 1925 (chronic bacillary dysentery). Ascending colon normal, transverse colon had scattered localised areas of congestion, descending colon several scattered active and partially healed ulcers. All this gut intensely congested. The rectum was represented by a parchment-like tube. Liver 2 lbs., small, capsule thickened are adherent.

Case No. 2.—No. 46433, died on 5th June, 1925 (chronic bacillary dysentery). From the cæcum to the end of the rectum the entire gut was affected; colour grey. Very foul smelling.

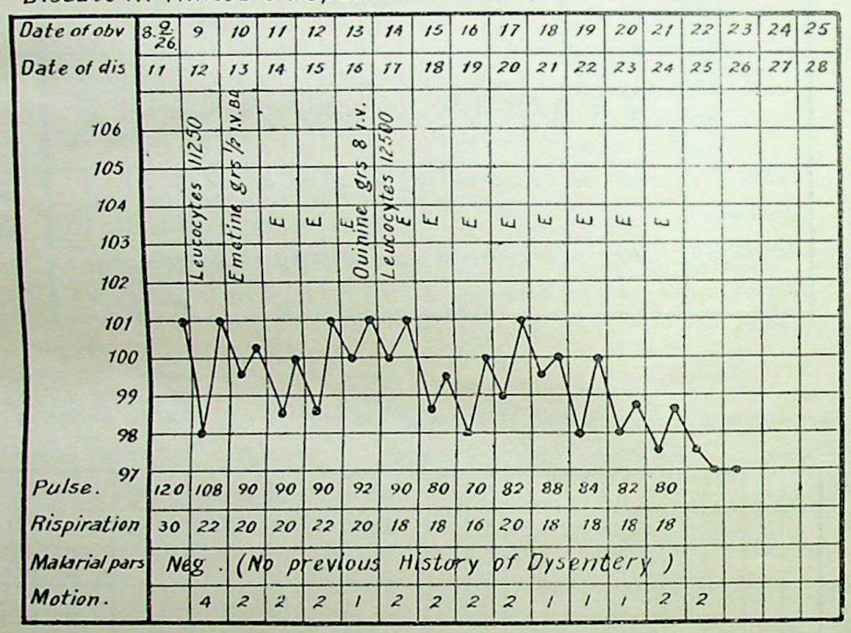
Gangrenous patches in cæcum, some gangrenous sloughs were just separating. Mucous membrane from the whole gut was wanting. The remains of extensive ulceration were evident. In places the serous and mucous coats were thin and transparent. Several scattered necrotic areas existed along the whole length of the large intestine.

Case No. 3.—No. 38048, died on 11th June, 1925 (amœbic dysentery). Cæcum congested, and thickened, pelvic colon and rectum showed marked fibrosis, two portions of about 6 inches along these areas of gut presented sloughing masses.

HOSPITAL HADDO.

No. 46674. Name ... Ngathin. Date of admission ... 8.9.26.

Disease ... Amœbic Hepatitis. Result .. cured.



Case No. 4.—No. 46138, died on 30th June, 1925 (chronic amœbic dysentery). Rectum to sigmoid, marked fibrosis and thickening of all coats and dark green in colour. Area bordering on a stage of extensive gangrene. From the ileo-cæcal junction on the side of the cæcum to the pelvic colon the bowel was soft, thin and denuded in places of its mucous coat. Scattered areas of hyperæmia were also seen as well as active ulcers.

Case No. 5.—No. 35643, died on 12th July, 1925 (amœbic dysentery). Duodenum had scattered pin-point hæmorrhagic foci; no hookworms were found before or after death. Ileum normal. From ileo-cæcal junction on cæcal side to rectum the bowel showed extensive sloughing and deep hæmorrhagic patches. Rectum was hypertrophied.

Case No. 6.—No. 46472, died on 21st July, 1925 (chronic dysentery mixed). From cæcum to rectum the whole gut was thickened throughout its length. Along this length there were alternate patches of congestion, hæmorrhage and gangrene. Enlargement of the mesenteric glands was observed and thickening of the mesentery.

Case No. 7.—No. 42399, died on 3rd August, 1925 (chronic bacillary dysentery). On opening the abdomen the first noticeable feature was the dark grey colour of the stomach and intestines, and the next feature was

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the omentum which formed a brittle mass, 7 inches long, 3 inches broad, and 1 inch thick. The intestines were all matted together and on the least pressure being applied broke off. An advanced state of putrefaction existed. The inside mucous lining was a putrid gangrenous mass and this state of affairs extended throughout the entire length of the intestines. The gangrenous process in the small intestine was not of the same degree as in the large gut and was comparatively less advanced. The pyloric end of the stomach was of the same gangrenous type as the duodenum, while the cardiac half was a dull brownish red colour. The hepatic and splenic flexures were firmly adherent all around. The peritoneum showed marked thickening and was of a greenish tint.

Case No. 8.—No. 32539, died on 11th August, 1925 (amœbic dysentery). The whole of the lower gut was markedly thickened and fibrous. Peritoneum was thickened. The mucous membrane was thrown into deep folds, and scattered about from rectum to splenic flexure were small areas of necrotic tissue. There was marked congestion and thickening of the cæcum. Glands near ileo-cæcal valve were hard to the feel.

Case No. 9.—No. 31976, died on 7th September, 1925 (chronic bacillary dysentery). From the ileo-cæcal junction to the rectum the large gut was œdematous and had patches of hæmorrhagic infiltration and a few soft sloughing areas scattered about. The peritoneum was markedly thickened.

Case No. 10.—No. 38097, died on 31st August, 1925 (amœbic dysentery). The transverse, descending pelvic colon and rectum was one mass of foul gangrenous ulcers. The ascending colon was not much affected. Hæmorrhagic foci were scattered about the upper end of the big gut. The gut was thickened at the two ends (cæcum and rectum). Peritoneum thickened and a little ascitic fluid present in the peritoneal cavity.

Finally our thanks are due to Major J. M. R. Hennessy, I.M.S., Senior Medical Officer, Port Blair, for his kind permission to publish this paper.

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THE OCCIPITO-POSTERIOR POSITION: ITS COMPLICATIONS AND TREATMENT; WITH OBSERVATIONS ON THE INSULIN-GLUCOSE METHOD IN SHOCK.*

By V. B. GREEN-ARMYTAGE, M.D., F.R.C.P., (Lond.),

LIEUT.-COL., I.M.S.

ON the 7th August, 1927, a patient was admitted to the Eden Hospital, Calcutta, with six inches of omentum hanging out of the vagina. She was a primipara, and the history given by the midwife was that "the vertex was presenting with the occiput posterior, and that as the patient had been a long time in labour a doctor was called in, who gave her an injection of pituitrin."

"Agonising pains resulted in the birth of a dead baby, followed by prolapse of the omentum." On examination a rupture was discovered high up in the anterior vaginal wall, which admitted three fingers. The whole anterior segment of the cervix had been torn away from the uterus. Such a termination of a vertex presentation must be very rare in Europe, but unfortunately it is far from uncommon in this country, where ignorance is made an excuse for brute force, and unrighteousness justifies the use of such a preparation as pituitrin which should be on the Poison Register.

In Europe, occipito-posterior presentations occur in roughly 10 per cent. of cases, with a fœtal mortality of 8 per cent. In the Eden Hospital, however, where cases arrived pathetically late, the fœtal death rate is 20 per cent. Consequently I have no hesitation in stating that our doctors and midwives need awakening to the importance of ante-natal care, and the diagnosis of posterior positions, for, as Dr. Lee remarks "the posterior position itself, and the operations performed by reason of it, cause untold and untellable suffering; often the child's brains are damaged, and the mother's soft parts lacerated and destroyed. In the United States three times as many babies are lost from this complication as from contracted pelves."

The condition is often carelessly or ignorantly overlooked, and labour blindly allowed to drag on until, in desperation, the attendant is obliged 'to do something,'—that something often spelling disaster, for the great majority of cases are unrotated occipito-posterior presentations.

In this connection it is not without interest to recollect that, according to their biographers, such notable men as Lord Byron and the ex-German Emperor were instances of this presentation in primiparæ. Lord Byron had a deformity of the foot, and the Kaiser has one of the hand, both subsequent to difficult labour which probably caused intra-cranial hæmorrhage.

Moreover, reverting to the days of the patriarchs, it is more than probable that the tragic death of Rachael (*Genesis*, Chap. 25, v. 16) was due to a posterior position; for she was elderly, and it is stated "She had hard labour, but in the midst of her hard labour the midwife said unto her 'Fear not, you are going to have another son.' And when her soul was departing, for pain and death was now at hand, she called the name of her son 'Benoni'—the son of my pain; but his father called him 'Benjamin'—the son of my right hand." This tragic birth should be of interest to British Israelites, who believe that the Anglo-Saxons are directly descended from Rachael, who was of the House of Ephraim,

* An address read before the All-India Licenciates Conference held at Burdwan in November, 1927.

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whose standard was a bull; for the division of Ephraim occupied the West, and as the Hebrew for 'bull' is 'angle'; they base the origin of the Anglo-Saxon race on this term. Moreover, as Ephraim became the leader of the ten tribes of the House of Israel, the whole of the House became designed by the name of Angle or Bull Saxons—in other words John Bull.

Diagnosis.

How can the practitioner or midwife anticipate a right-occipito-posterior presentation, for 80 per cent. of such cases are on the right side? Suspicions should be aroused in the case of a primipara when the head of the child is found unengaged, or floating above the brim of the pelvis in the early stages of labour. Such a condition is the result of non-flexion of the head, and can be verified by finding the back far over to the right, with the limbs easily palpable in front.

On the other hand, if there be engagement of the head, and deep pressure is made with both hands in the direction of the pelvic axis, it will be found that one hand is arrested by a tennis ball-like prominence (the fœtal forehead) just to one side of the symphysis; whereas the other hand sinks deeply into the pelvis on that side to which the occiput is directed, and the back is felt.

Another sign, most easily felt in multigravidæ is that when both hands are pressed into the abdominal wall half way between the umbilicus and the symphysis, they sink evenly and deeply and without resistance, owing to the fact that in a posterior position the anterior shoulder is well away from the middle line, and is therefore not palpable. But in fat patients, or those whose abdominal wall is taut, sometimes nothing definite can be determined. In such, perhaps, suspicion may be raised by hearing the fœtal sounds far out in the flank.

For my own part, in doubtful cases I lay most stress on the fact that in nearly all posterior positions there is a tale of premature rupture of the membranes, and it is this circumstance that guides me when a rigid abdominal wall tells me nothing. In such a case the cervix may remain like a thick rubber ring for days, and I know of no condition in obstetrics which gives more anxiety in this country, where the risks of sepsis are trebled. The reason for the early breaking of the waters is, of course, that the non-flexed head does not fill the lower uterine segment, with the consequence that the uterine pressure is exerted upon the fore-water. *Such rupture of the membranes may be regarded as Nature's red flag, warning the midwife or practitioner of 'danger ahead.'*

Amongst the poor, where a midwife is in attendance, the doctor is often not called in until late in labour, and then perhaps only to find that the vaginal picture is totally obscured by an enormous caput, which prevents any delineation of the fontanelles. In such a case his suspicions may be aroused by hearing it stated that the head has remained *in statuo quo* for hours, or that it descends a little with each pain and then goes back again, or that there is meconium in the liquor amnii.

Before any method of treatment is adopted, one's first duty is to give chloroform and introduce the whole hand into the vagina in order to discover the direction of the pinna of the ear.

Treatment.

Considering the great mortality and morbidity of occipito-posterior presentations, the practitioner should be on the alert to diagnose the condition and be prepared to carry out certain measures, according to the stages in which he sees his patients. These from the point of view of treatment can be summarised as follows:

1. Before labour.
2. The first stage of labour.
3. The second stage of labour.
4. Complications.

(1) *Before, or in the early stages of labour,* when a diagnosis has been made, or the suspicion that a right occipito-posterior position exists has been roused,—*provided the head of the child is not overlapping the brim of the pelvis, and therefore obviously a case for Cæsarian section*—the midwife should apply, under the doctor's orders, a Buist pad.

In case this method is not generally known, it may be well to quote Mr. Buist's own words. 'The bowel having been well emptied, a binder is laid under the patient, and two towel pads are prepared; one rolled to the thickness of the forearm, and the other folded 6 inches square. The rolled pad is pinned inside the binder, and when the latter is drawn tight it should be behind and parallel to the fœtal back. The flat pad is also pinned to the binder, and when the latter is tightened lies on the front of the belly over the fœtal limbs, pressing them back.

The patient is told to lie on the side to which the back points, to assist flexion and descent of the head. The rationale of the pad and binder is simple; namely, that of two pressures acting in opposite directions as remote as possible from the axis, around which rotation is desired.'

This easy method has been very successful in my hands; and only in about 20 per cent. of cases has it failed.

(2) *In the first stage of labour,* when pains are strong and the membranes are intact, the patient must not be allowed to bear down. Give morphia, gr. 1|4, scopalamine, gr. 1|200, and empty the bladder and rectum six-hourly.

If the head has descended into the pelvis, assist rotation by telling the patient now to lie on the side opposite to which the back is directed.

If the membranes have ruptured prematurely and the cervix is of the size of two or three fingers, anxieties and troubles loom ahead. I would advise that an injection of morphia be given and vaginal douches administered four-hourly. As time passes, if no further dilatation

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occurs, the liquor amnii dribbles away and dry labour threatens. The fœtus may begin to move tumultuosly in the abdomen, and later—as intra-cranial stress occurs—its heart sounds will become slower and slower: meconium-coloured liquor amnii will issue from the vagina and movements become imperceptible.

In such a case with a non-dilated cervix, at first sight one might feel helpless, but if the general condition of the mother and fœtus is still good, the Polak method of plugging the cervix and vagina with sterile gauze soaked in glycerine is well worth trying: for a few hours later, if the cervix will admit three fingers, it may be possible under chloroform anæsthesia to grasp the head between the fingers and thumb, push up the forehead and rotate the head, whilst an assistant per abdomen manipulates the back and shoulders forwards.

This condition of non-dilatation of the cervix is in many cases one of reflex spasmodic contraction, due to irritation of the circular muscular fibres by the hard fœtal head, and therefore is analogous to a 'contraction,' which as you are aware is peculiarly liable to occur in cases where the membranes have ruptured prematurely, and can exist at any level of the uterus. This ring is more often a cause of dystocia than many realise, and it is also frequently seen in the hour-glass contraction associated with retained placenta. Smellie in *Case* 263, Collection xxix, dated 1746, describes finding a contraction ring in front of the shoulders.

The prototype of such a 'contraction ring' is to be found in the spasmodic stricture of the male urethra—a condition which, as you know, is no respector of religions or rank; and, just as spasm of the urethra is treated by morphia, hot baths, and the passage of a metal catheter, and possibly even by supra-pubic puncture, so is this spasm of the cervix treated by morphia, hot douches, manual dilatation, and later—if danger threatens—by craniotomy.

If the membranes have ruptured a long time before and the fœtal heart sounds are below 110, it is certain that the fœtus will not be delivered alive. In such a case, although the cervix is only dilated to three finger breadths, one has no right to further jeopardise the life of the mother from sloughing and sepsis. I would recommend that a cranioclast be applied to the head, after perforation, and then the patient be placed in bed with a weight extension of 4 lbs. attached to the cranioclast over the end of the bed. In the course of a few hours the steady pressure of the head upon the cervix will cause its complete dilatation, and the fœtus will be born without further complications or manipulation. Contraction and retraction will occur and the placenta be expelled without hæmorrhage or retention.

(3) *When labour is far advanced*, and the head is in the pelvis, the Buist method is of no avail. Here it is that the sovereign remedy of patience comes in—a remedy easy in hospital or nursing home, but by no means so in private practice, with relatives clamouring for the doctor 'to do something.'

Some years ago I read and recently have re-read the great treatise of Dr. William Smellie, that most famous accoucheur who practised in London some 185 years ago, and I venture to think that some of our so-called up-to-date young obstetricians might learn much from the perusal of his three volumes. For instance, you will frequently find the following note; 'I found the membranes had been broken a long time and that the woman was very uneasy and her friends importunate. I amused them with a palatable mixture, of which I directed the patient to take two spoonfuls every half hour; my intention being to gain time'. Also his *Case* 251, Collection xxvii, where 'I prescribed some innocent things to amuse the patient and her friends, who were extremely anxious and went away after having desired that she might not be hurried about or fatigued'. Dr. Smellie possessed forceps, but he knew when to use them and the advantage of allowing Nature her fullest scope, providing the bladder and rectum were empty.

Premature application of forceps, or their high application before the maximum circumference of the fœtal head has passed through the cervix, is a crime; for not only may the child be injured, but it is certain that the cervix and soft parts will be torn, with subsequent prolapse, due to relaxation of the pelvic floor.

Mr. Comyns Berkeley feels so strongly on the subject of forceps, and also of the improper use of the uterine curette, that he has suggested that there should be a special verse added to the Litany in the *Book of Common Prayer*, saying 'From the obstetric forceps and the uterine curette, Good Lord deliver us'!

The busy practitioner, harassed by the relatives and worried by the many calls upon his energies, is apt to apply forceps or inject pituitrin, little reckoning the dangers incurred, and forgetting the fact that 60 per cent. of all gynæcological operations are the result of bad midwifery.

If the right occipito-posterior head has been for hours in the pelvis and no advance has occurred, despite strong pains, and the fœtal heart sounds are good, every endeavour should be made to rotate the head. This manœuvre is not really very difficult, and is often successful, provided that

(1) The patient is under chloroform.

(2) The whole hand can be passed into the vagina in order to grasp the head between the thumb and fingers.

(3) Before gripping the head one passes two fingers beyond the head, to reach behind the anterior shoulder and force it forwards.

(4) A competent assistant is present, to rotate the shoulders per abdomen, at the same time and in the same direction as the head is rotated.

(5) After rotation a binder is applied.

The case can then be left to Nature, or forceps used to assist the expulsive pains.

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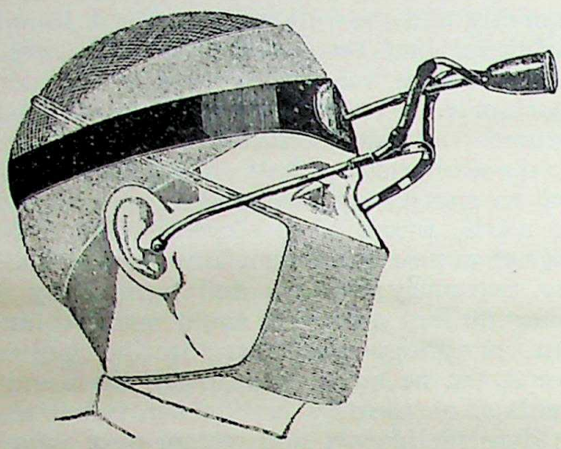
If manual rotation fails, should forceps be applied? For my own part, I do not think it matters whether one applies the method of Smellie, Scanzoni, Lamond Lackie, or Kielland, provided one is gentle and does not lacerate the mother. Personally, I control the action of my forceps by the aid of a de Lee head stethoscope, with which I can count the fœtal heart sounds without soiling my hands.



The de Lee's Head Stethoscope.

If this precaution is not taken, cervical or cerebral hæmorrhage may occur, and one may have the mortification of delivering a dead or dying baby.

The question as to whether forceps should be made to rotate the head is an old one, and has cropped up ever since Smellie in 1745 stated that 'it gave him great joy'; *vide Case* 258, Collection xxviii. But it should be remembered that about the same date Smellie also described his success with manual rotation, so it may be that his 'great joy' was mainly due to the fact that in those cases in which he succeeded in pushing up and rotating the head, he would have been equally jubilant had he tried manual rotation.

The whole art of forceps delivery in these difficult cases lies in the co-operation between the operator and his assistant. The forceps are applied as usual, and having pushed the head backwards, the handles are then rotated in a wide circle, whilst the blades remain more or less quiescent (just as in the *coup de maître* passage of a metal sound through the male urethra); the assistant rotating the anterior shoulder of the fœtus towards the middle line and keeping it there whilst this manœuvre is in progress. In many cases the head will rotate, and if so, then the forceps are removed and re-applied in the correct position, delivery being effected by gentle traction and a pendulum movement.

If rotation fails, there can be no doubt about it that—so to speak—one is 'up against it,' for now one must either use *force majeure*, or perforate. At this juncture, personally I set great store upon the use of the de Lee stethoscope, for if the heart sounds are over 110 I think one is justified in attempting extraction, even though the occiput is pointing backwards. For steady gentle traction with straight forceps is undoubtedly at times successful, if the head is not large or the pelvis small.

But should the fœtal heart sounds be flickering or slow, I do not recommend traction. Far better is it to perforate the head with forceps *in situ*, and deliver the baby, remembering that a dead baby and an uninjured mother are better than an injured mother together with a dead baby.

The infant has not died in vain, if thereby mother and doctor are warned with regard to proper ante-natal care, and the advantages of induction of labour or Cæsarain section in any future pregnancy.

COMPLICATIONS.

Rupture of the uterus is one of the rarer sequelæ of a posterior position, and in the case previously recorded it will be remembered that it occurred after the injection of pituitrin. I am showing you to-day, however, two uteri which were removed *post-mortem* from cases where this tragedy resulted from the application of forceps. In both specimens you will observe that the rupture extends from the cervix almost to the fundus in that uncovered portion of the uterus between the layers of the broad ligament.

There can be no doubt that such tragedies happen in private practice much more frequently than is supposed, and I am inclined to think that when it is stated that a patient died of shock (and not hæmorrhage) shortly after forceps delivery, that if an autopsy were procurable rupture of the uterus would be found to be the cause of death.

The treatment of rupture of the uterus, when the baby is born, is therefore of immense importance, for if there should be any delay the patient may die from sepsis or obstruction.

In the case cited at the beginning of this address the omentum was hanging out of the vagina; but I have seen other cases where a loop of small intestine had prolapsed; two in which the sigmoid colon with engorged appendices epiploicæ lay in the vagina; and one in which the doctor, having given a lysol intra-uterine douche, suddenly realised that very little of the fluid was returning—it had passed through the hole in the uterus into the peritoneal cavity!

In Europe such statements as these might be considered false; but truth is stranger than fiction, and I can assure you that many members of the Women's Medical Service in India can corroborate such statements. This being so, it behoves me to instruct you in a method which can be carried out in a private house, or under conditions which prohibt the removal of the patient to hospital; for, as you are aware, the possibilities of hospital treatment in this huge country may not exist; and, moreover, even in a big town many patients may refuse to go into hospital.

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Your motto should be '*Arma et age*'; 'be up and doing'; for many of these desperate cases will recover if treated efficiently.

First remember that these patients rarely die of hæmorrhage, because the torn blood vessels curl up and retract into the uterus; therefore it is not hæmorrhage so much as shock that one has to treat.

SHOCK.

I would advise every obstetrician to carry in his bag two ampoules of glucose, which, when added to a pint of sterile water, will make a 10 per cent. solution. This should be injected intravenously, taking at least an hour to do so; for, if given faster, there is danger of acute dilatation of the right heart.

In addition we have a new weapon of defence against shock in insulin; for, as you know, the first defensive reaction of the organism in shock is the mobilisation of all the available glycogen in the blood stream, to be distributed to the body cells to furnish them with energy.

This supply, however, is soon exhausted; hence the necessity for replenishing the glycogen with glucose becomes of extreme importance.

To combat shock it is necessary to give to the body some substance which will give rise to an immediate supply of energy, whilst at the same time furnishing sufficient fluids to keep up the circulating volume of blood; for the state of shock is really an internal asphyxia and acidosis with oxidative processes held in check. Consequently any method for promoting combustion and oxidation, and at the same time providing heat energy, will be effective.

The amount of insulin to be injected depends upon the amount of glucose given. For every 50 grains of glucose 1 unit of insulin should be given; therefore, if you have used 1 pint of a 10 per cent. solution, you must inject 16 units of insulin.

The total amount of insulin, however, should be divided into equal doses; one part being given a quarter of an hour after the intravenous administration has begun; the remainder at the end.

Nixon, from whose paper in the *Clinical Journal* this information has been taken, emphasises the fact that there are some drugs which influence the beneficial effects of the insulin treatment; for instance *adrenalin counteracts the insulin effect, and pituitrin diminishes the sugar fall; but on the other hand, ergotoxin, ergotinin, and ernutin, given previously, increase its value.*

Since I learned this method, I am sure that I have been able to prevent shock—or tide over patients who would otherwise have developed shock after severe operations. It is because of the ease and simplicity of the method that I bring it to your notice, for I am aware that many of you are occasionally 'up against' the problem of post-operative shock, or the condition of which I am speaking—rupture of the uterus.

Having treated the initial shock with glucose and insulin as directed above, the parts should be cleansed and a thorough examination made as to the site of rupture, or the possibility of prolapsed intestine or omentum.

If the rupture is extra-peritoneal, with extravasation into the broad ligament, as a rule, washing out the clotted blood and packing with sterile gauze is all that is necessary. For, as I have said, hæmorrhage from the retracted vessels is not common. Therefore all that one has to do is to promote adequate drainage.

Should omentum or gut be presenting in the vagina, either through the vaginal wall or through a torn cervix, your duty is to carefully cleanse the gut with sterile saline and then gently push it back into the peritoneal cavity through the hole in the uterus or vagina. This hole can then be lightly packed with gauze, acting as a drain. For it should be remembered that the circular and longitudinal fibres of the retracting uterus automatically tend to close the hole.

If omentum alone has prolapsed, as in the case cited, the portion which has come down to the vulva should be ligatured and cut off, and the proximal part—after cleansing—be replaced through the hole in the vagina or uterus into the peritoneal cavity, and a gauze drain inserted.

In both cases it is imperative that a posterior colpotomy should be done with a pair of scissors or a knife and a gauze drain be inserted into the pouch of Douglas. The patient is then placed in Fowler's position and given a dose of liquid extract of ergot, or an injection of ergotinin citrate.

Such measures as these, if carried out without delay, are successful in the great majority of cases. For example, in the case of the lady who was given an intra-uterine douche, and in whom the fluid did not return, I carried out the above procedure for the doctor who was in charge, and can assure you that it was a queer sight to see a pint of lysol pour out of my incision into the pouch of Douglas. Three months later she conceived, carried to full term, and was delivered by natural means.

Posterior presentations in India are the commonest cause of vesico-vaginal fistula and complete rupture of the perineum. Circular sloughing and ulceration of the vagina, with subsequent atresia, is another very common complication of posterior positions, and one which is very frequently seen in this country— a condition almost inoperable, and one which gives rise to a great deal of mental and physical distress. Both conditions are preventable by proper ante-natal and intra-natal care.

Again, many cases of coccygodynia owe their origin to impacted occipito-posterior positions. But perhaps the most frequent complication of all is prolapse or hernia of the pelvic viscera.

Long and accumulated experience gained in a large hospital, and as a consultant, emboldens me to stress the above facts in the hope that doctors

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and midwives throughout India will awaken to the importance of correct diagnosis and treatment of occipito-posterior presentations.

Note.—Time forbids my dealing with the various intra-cranial injuries of the children, many of whom die, though others may survive with permanent lesions—such as those of Lord Byron and the ex-Kaiser; whereas others are mentally deficient. Nor can I deal with those cases of rupture of the uterus which occur during labour before the birth of the baby, necessitating immediate abdominal operation, with removal of the fœtus, and subsequent suture or excision of the uterus.

I have to thank my friend Dr. Kedar Nath Das, C.I.E., for lending me from his library Smellie's *Treatise on the Theory and Practice of Midwifery*, Vols. I, II and III; edited by A. H. McClintock, and published by the New Sydenham Society.

THE MORE EASILY OBSERVED PATHOLOGICAL CHANGES IN THE CEREBRO-SPINAL FLUID, AND THEIR CLINICAL INTERPRETATIONS.

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THE object of this is to reiterate the manner in which simple examination of the cerebro-spinal fluid, without the assistance of a laboratory or expensive apparatus, when combined with the clinical findings, can prove of the greatest value in diagnosis.

It is well established that unadulterated cerebrospinal fluid is perfectly transparent, even when viewed by the strongest illumination, and although in certain cases there may be no opacity, this opacity when seen is a definite indication that disease is present. In order to determine this, some care must be taken in collecting the fluid. It is best to have at hand three tubes when withdrawing fluid by lumbar puncture. One of these tubes is specially cleaned before being sterilised, first being washed in hot soda solution, to remove all grease, and then cleaned in three washes of spirit. Into the first of these tubes the first specimen of fluid withdrawn is collected; this is usually blood-stained from injury to the anterior plexus of veins. When the flow of blood has ceased, the second tube is opened, and a few c.c. of fluid collected therein. This serves a double purpose, for by this means the needle is washed out of any remaining blood, and this specimen—although not pure enough for cytological examination—is sufficiently pure for the Wasserman reaction if needed. The third tube, which has been specially cleaned, serves to receive the last portion withdrawn. Thus the two greatest fallacies in the examination for opacity, namely, admixed blood and dirty glass-ware, have been avoided. Sometimes cotton-wool fibres cause trouble, but after a little care has been exercised in the preparation of the plug, this can also be eliminated. The fluid should never be examined by direct light, because it is not possible thus to see the finer degrees of opacity. The method which has been found to give the best results in this connection is the use of an ordinary reading lamp placed on a black surface, against which only the lower two inches of the tube are allowed to be in contact. The tube is then viewed from above, and a comparison is made against a tube containing pure distilled water. By this means the fluid is seen illuminated by indirect light, on a dark background.

Disease.	Opacity.	Clot.
Influenzal meningitis	slight.	
Meningococcal meningitis	very slight ..	greenish, not always present.
Pneumococcal meningitis	greyish ..	pearl grey clot.
Tubercular meningitis	slight, increased by addition of N/NaOH.	delicate clot with clear fluid. Clot is pathognomic.
Gummatous meningitis	definite.	
Pyogenic meningitis..	gross ..	heavy clot.
Acute early anterior poliomyelitis ..	faint ..	may form.
Encephalitis lethargica	very faint.	
Neurosyphilis ..	present ..	clot may form.
G. P. I. ..	definite.	

The colour of the fluid is also of importance. If it is still blood-stained after the precautions already enumerated have been taken, allow it to stand for a short time, when if no sediment of red blood corpuscles is formed, and the supernatant fluid is still reddened, the admixture of blood is not accidental, but is due to some pre-existing cause of hæmorrhage, such as those formed in the subarachnoid hæmorrhages of encephalitis lethargica, from cerebral tumour, or injury to the skull. In this latter connection it is interesting to note that the cerebrospinal fluid withdrawn may not appear reddened for a day or even longer. If no colour is not obvious, the fluid should be examined by the method of indirect lighting, but in this case over a white background. A yellow colour is imparted to the fluid in those diseases of which jaundice is a symptom. A very similar colour is also seen in tuberculous meningitis. Pneumococcal meningitis gives a greyish tinge, and pyogenic meningitis a definite green colour. In those cases in which adhesions have formed, or where tumour or deformity cause obstruction to the circulation of the cerebrospinal fluid, the fluid when withdrawn, is of a green colour, and frequently clots immediately after removal. Specimens collected from cases of polyneuritis, of any ætiology except diphtheritic, are also often greenish coloured and show immediate coagulation.

The estimation of the total protein content of the cerebrospinal fluid is easily carried out, and constitutes one of the most valuable tests available. It is most easily estimated in the following

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manner. A series of standard opacities are made by placing in nine small tubes, which have previously been thoroughly cleaned and sterilised, twenty drops of sterile serum diluted to contain 1.0, 0.75, 0.5, 0.25, 0.1, 0.075, 0.05, 0.025 and 0.01 per cent. of total protein, as measured by Aufrect's albuminometer. To each of these nine tubes are then added five drops of a thirty per cent. sterile solution of trichloracetic acid, and the tubes sealed off. The precipitates thus formed are permanent. To carry out the estimation twenty drops of the cerebrospinal fluid are placed in a similar tube, and five drops of the standard trichloracetic acid solution added, and the precipitate thus formed compared against the standard opacities.

Now normal cerebrospinal fluid never contains more than 0.003 per cent. total protein, and any increase in this is a definite indication of disease of the nervous system, with one exception, that is, uræmia. Again this increase is in the albumen fraction, except in syphilis of the nervous system and some rarer cases of encephalitis lethargica. In neurosyphilis the increase is in the globulin content, and, this incidentally is not an increase in the normal globulin of the fluid, but due to the formation of euglobulin. Pandy's test affords a simple method of demonstrating the presence of globulin. One c.c. of a 6.5 per cent. solution of carbolic acid is added to one or two drops of the fluid, when, if globulin be present, a blue precipitate will be formed.

Protein Contents.

Normal ..	.. 0·015 to 0·03%	
Uræmia ..	.. 0·04 to 0·07%	the only general disease giving increased protein.
Diseases of the choroidal plexus	.. 0·04 to 0·1 %	
Tabes ..	.. 0·05 to 0·08%	
Neurosyphilis	.. 0·05 to 0·1 %	globulin + ++
G. P. I. ..	.. " " "	
Acute anterior poliomyelitis, early	" " "	
Pyogenic meningitis	0·1 to 0·2 %	
Tubercular meningitis	0·1 to 0·25%	
Meningococcal	0·3 to 0·8 %	highest total protein.
Tumour above the cerebellum ..	.. 0·1 to 0·25%	
Tumour below the cerebellum	.. 0·03 to 0·1 %	
Encephalitis lethargica	up to 0·15%	
Landry's paralysis ..	up to 0·05%	

As regards the other components of the cerebrospinal fluid, the urea and chlorides run a parallel course to their concentration in the blood. The chloride content is increased in pneumococcal meningitis. With regard to the sugar, as estimated by Benedict's method, in the absence of organisms acting on it, the dextrose content of the normal cerebrospinal fluid, which is about 0.1 per cent., is found to be decreased in tabes, tubercular meningitis, general paralysis of the insane, and in the earlier stages of the meningeal types of acute early anterior poliomyelitic type. It is found to be increased in cases of encephalitis and the later forms of acute anterior poliomyelitis.

In the fluid withdrawn from cases of general paralysis of insane it has been found possible to demonstrate the presence of cholesterin by the following method. To one c.c. of the cerebrospinal fluid about half a c.c. of acetic anhydride is added. After allowing this to stand for two minutes, one c.c. of pure sulphuric acid is run on to the liquid, when a transient blue colour is produced if cholesterin be present.

When nerve degeneration is present choline can be demonstrated in the following manner. Ten c.c. of the fluid is taken, and if blood is admixed is precipitated with alcohol. This is dried, extracted with alcohol, again dried, extracted with pure alcohol, when the addition of platinic chloride in the presence of choline produces octahedral crystals.

Lange's colloidal gold test affords certain evidence in some cases. It should be ascertained before the test is begun that the gold solution is still ruby coloured. Ten tubes are used, and these must be thoroughly cleaned. The cerebrospinal fluid is prepared in dilutions ranging from 1 : 10, 1 : 20 up to 1 : 5120. For this purpose saline is used of 0.5 per cent. strength. To each tube is then added 2.5 c.c. of the colloidal gold. The results are read after thirty minutes or more have elapsed, during which period the tubes are allowed to stand. The colour reaction is expressed by the cyphers 0, 1, 2, 3, 4, 5, varying from no reaction to the formation of a heavy blue precipitate. There are three main types of result expressed in terms of the three types of curve obtained, namely, the paretic, luetic, and the meningitic. The paretic curve is shown in cases of nerve degeneration, and when the luetic curve is present it may be stated there is no paresis. In conjunction with the Wasserman reaction of a positive nature, the paretic curve would indicate the presence of general paralysis of the insane; in the absence of a positive Wasserman, a diagnosis of sclerosis. Whilst this is true, it should be remembered that this test is given in an earlier stage of the disease than that in which the Wasserman reaction would be shown as positive. Cerebral abscess gives meningitic results, and cases are on record to show that the hemiplegias will give the luetic reaction.

Finally we come to the cytology of the cerebrospinal fluid. For this examination it is essential that there should be good instruments and good lighting. A cytological examination carried out under adverse circumstances is often more misleading than useful. There are four main types of cells found, classified according to their origin.

1. Cells liberated by the actual destruction of brain tissue.

2. Cells formed in the inflammation of the soft membranes, and which are almost certainly

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identical with those seen in the perivascular cuffing of encephalitis lethargica, which are at liberty to wander throughout any of the prolongations of the sub-arachnoid space.

3. Cells from the inflammation of the cerebral parenchyma.

4. Cells derived from the blood, seen either in cases of hæmorrhage of the cerebral vessels, or in an inflammatory exudate caused by any acute suppurative condition.

Disease.	Cytology.
Normal ..	Not more than 6 per c. mm.
Tubercular meningitis	In the early stages some polymorphs, later lymphocytes and mononuclears.
Syphilitic ,,	Lymphatic.
Typhoid ,,	Lymphocytic.
Meningococcal meningitis	Early up to 80 per cent. polynucleosis, later lymphocytic.
Pyogenic meningitis ..	Up to 98 per cent polynucleosis.
Pneumococcal ,, ..	90-95 per cent. polymorphonuclears.
Acute anterior poliomyelitis ..	Firstly 70 per cent polynucleosis, then lymphocytic; drops at the end of 14 days.
Sclerosis ..	Up to 25 cells per c.mm.; lymphocytes.
Brain abscess ..	Polymorphonuclears.
Encephalitis lethargica	Lymphocytic; it should be remembered that at least 33 per cent. of cases are acellular.
Hæmatomyelia ..	Lymphocytic.
Sinus thrombosis ..	At first lymphocytic, then polynucleosis.
Post-basic meningitis of infants ..	Polymorphs at first seen; later only lymphocytes.
Mumps	Lymphocytes seen.
G. P. I. ..	Lymphocytic usually as many as 250 per c.mm.

From the above remarks it will be noticed that for the purposes of eliminating a number of diseases the protein estimation herein outlined, which can almost be done at the bedside, is the important chemical reaction. This coupled with a cell count is nearly sufficient to form a diagnosis in relation to the clinical facts elicited. If one last word of warning might be added, it is to emphasise the necessity of examining cerebrospinal fluid the moment it is obtained, and this especially refers to the cytology of the fluid.

THE SCOPE OF COLLAPSE THERAPY (ARTIFICIAL PNEUMOTHORAX AND THORACOPLASTY) IN THE TREATMENT OF PULMONARY TUBERCULOSIS IN INDIA.

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INTRODUCTION.

PULMONARY tuberculosis, although not generally believed to be so, is very common in India, especially in large towns and cities. The annual public health reports from various provinces clearly show that it is on an increase primarily in the large cities, affecting the larger towns to a less extent, and still less the villages. The principal predisposing causes are also increasing owing to more people adopting town and city life with its accompanying evils of overcrowding, slums and insanitary conditions. There are thousands of houses and chawls in Bombay, which are filthy, dark and hardly ventilated at all. In these again in small rooms there are staying more than 3 or 4 persons, and even more sleeping at night. In the Improvement Trust chawls, etc., owing to the ignorance of people of the elementary principles of hygiene the avenues of air and light are blocked up by means of curtains, etc.; even educated people are hopeless in their ideas of ventilation, fresh air, diet and other elementary principles of physiology and hygiene. Another most important predisposing factor is poverty and consequent under-feeding. Many are born with low vitality owing to the effects of these factors on the parents. Added to this are evil social customs, such as early marriages, the purdah system and the joint family system with close social ties; early marriages subject immature and weak girls to repeated pregnancies and prolonged periods of lactation and the quotation comes true that "Many a girl bears her first pregnancy well, her second badly, and her third never"; because they die of phthisis. Many a girl is crippled and ages early owing to this and such other factors. The purdah and zenana system, specially among Mohamedans where the women are shut up in the worst, darkest and ill-ventilated rooms of the house, contribute generally also to the detriment of health and consequent predisposition to phthisis. Add to these factors the constant ill-health due to repeated attacks of commonly prevailing illness such as malaria and influenza and the health of the individual is ruined. If by chance there is a case of phthisis in the house, owing to the joint-family system and close social ties and ignorance, it will not be isolated and infection will soon spread by careless spitting to the inmates debilitated by the above factors. Young healthy children are allowed to associate with the advanced cases in the house and the seed of the massive infection is sown. There is an appalling mortality in this country from this disease, especially in females between 15 and 30 years of age. In the cities of Calcutta and Bombay the mortality from phthisis and pulmonary tuberculosis is reported to be about 2 per 1,000, but if we look thoroughly into all the statistics there is large group of diseases classed under respiratory diseases, the death-rate and mortality from which is about 15 or more per 1,000. I think that at least half of these are due to pulmonary tuberculosis, as many cases are not only not reported properly, but are not even diagnosed. Pulmonary tuberculosis is not only extremely prevalent, but also on the increase, and one

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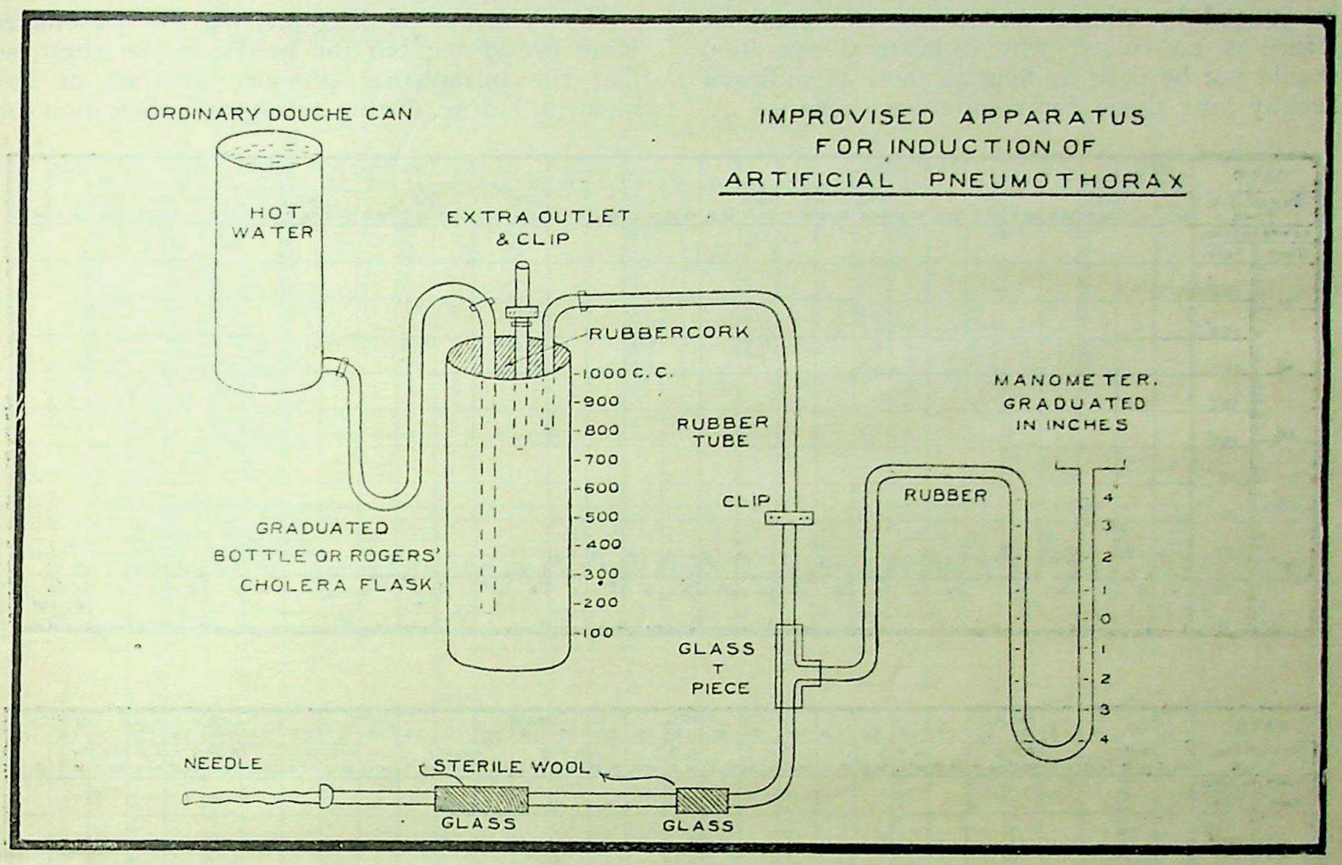
cannot wonder when one looks about and sees the overcrowded slum areas with rooms like cells and dungeons, full of smoke and filth and with hundreds of patients spitting promiscuously all over the place and spreading the infection. It is generally of acute type in young persons and is spreading to the villages also as the communications between them and larger towns improve

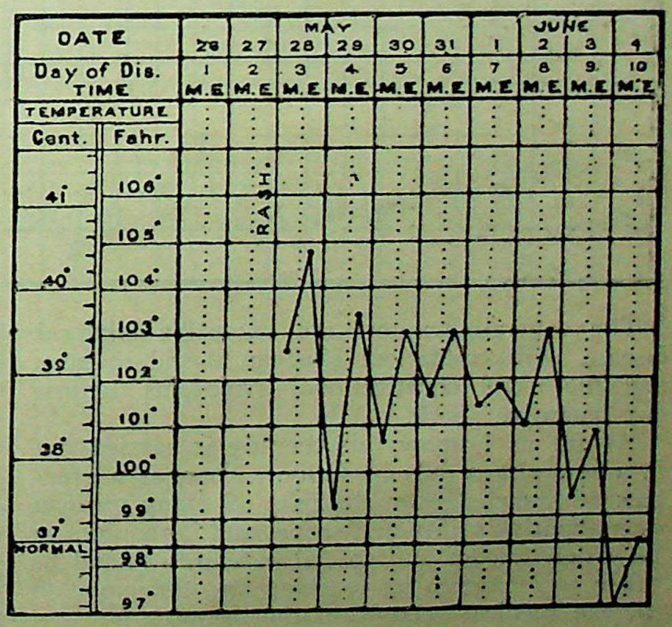
Efforts are being made in some Indian towns on these lines but they are very inadequate. Moreover owing to apathy and ignorance people do not take advantage even of the existing facilities. The patients do not carry out the treatment patiently and many come in the late stage. So there is plenty of scope for such an established form of treatment as, *collapse therapy.* It is



and new centres of industry are formed; young persons come from villages to the towns and cities for service, education, or for family reasons, and within a few months or years show acute signs of disease. They then go to their home for a change and spread the infection to other inmates of the household.

What is being done for this terrible scourge in our country? There are no doubt great difficulties in the way such as ignorance, poverty, religious prejudices and superstition. All these are required to be removed by proper education and sanitation. In other advanced countries the rapid decline of incidence and death-rate of tuberculosis has been brought about in the last few years by an organised crusade against it throughout the country.

The measures adopted are.—(1) Improved economic conditions and housing. (2) Better education in personal hygiene and improved sanitation. (3) Improved medical education and improved training of medical men in the early diagnosis and treatment of pulmonary tuberculosis. (4) Establishment of tuberculosis hospitals and sanatoria for the isolation and treatment of cases and removal of source of infection.



estimated in other countries that about 10 per cent. of pulmonary tuberculosis cases are suitable for this kind of treatment, and if only relief is

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to be given there will be many more benefited. One can do a great deal of good in many advanced cases when there is no other form of treatment useful and when there are no other contraindications.

No case is too advanced if only it is one-sided, as long as there are not adhesions which will prevent the compression of the lung. The essential factor is softness of the lung which can be judged by clinical and *x*-ray examinations. There is no reason why a bilateral operation should not be done as long as there is sufficient healthy lung tissue for respiratory exchange.

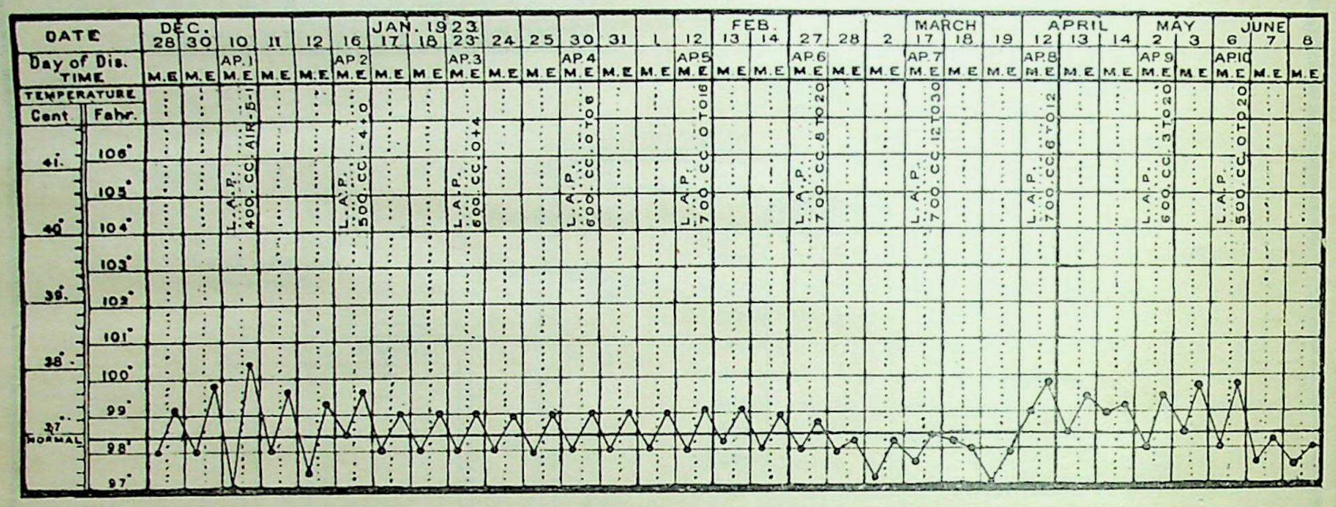
(1) A reservoir or reservoirs for the gas or gases used, which are oxygen, nitrogen, or air.

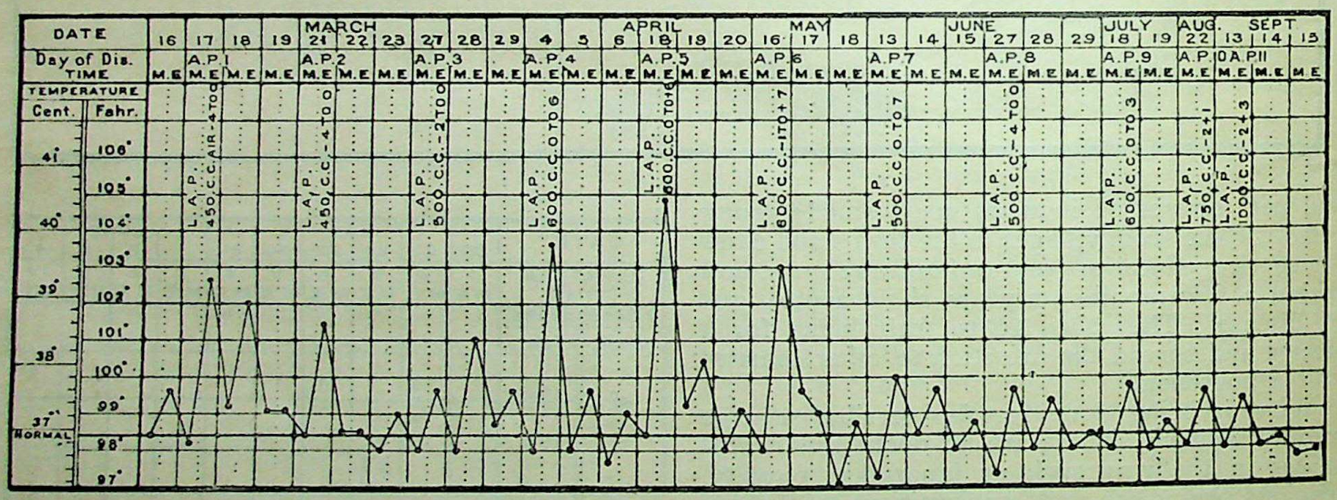
(2) A means of displacing the gas by running water or an antiseptic solution into them.

(3) A means of conveying the gas into the chest by a tube leading from the gas bottle to a hollow needle.

(4) A manometer in connection with the latter.

(5) A means of disconnecting the manometer from everything but the needle in the chest, so that the intrapleural pressure attained at any moment, before, during or after the operation can





The contraindications are extensive bilateral disease with cavitation, chronic fibroid disease, and the usual constitutional symptoms against any operative shock.

As far as I know this therapy is carried out in a few places only in India. There is a great lack of knowledge on the part of many medical men about its utility and scope, and it requires to be widely known and special measures should be taken to introduce its teaching and technique in all the medical schools in this country.

ARTIFICIAL PNEUMOTHORAX.

Technique and Apparatus.—Generally the apparatus is composed of the following parts:—

be observed independently of the hydrostatic pressure from the gas bottle and fluid reservoir.

Many complicated apparatus have been suggested. The main requirements in a country like India for an apparatus are that it should be cheap, handy (rubber and glass tubes are not easily procurable anywhere and everywhere) and portable (as many patients will not come to the hospital). I have been using an improvised apparatus (see diagram) consisting mainly of a douche can and a bottle or Rogers' cholera flask, which can be moved up and down on a stand, a graduated U-shaped glass tube as a manometer, and a small sized needle from a Potain's aspira-

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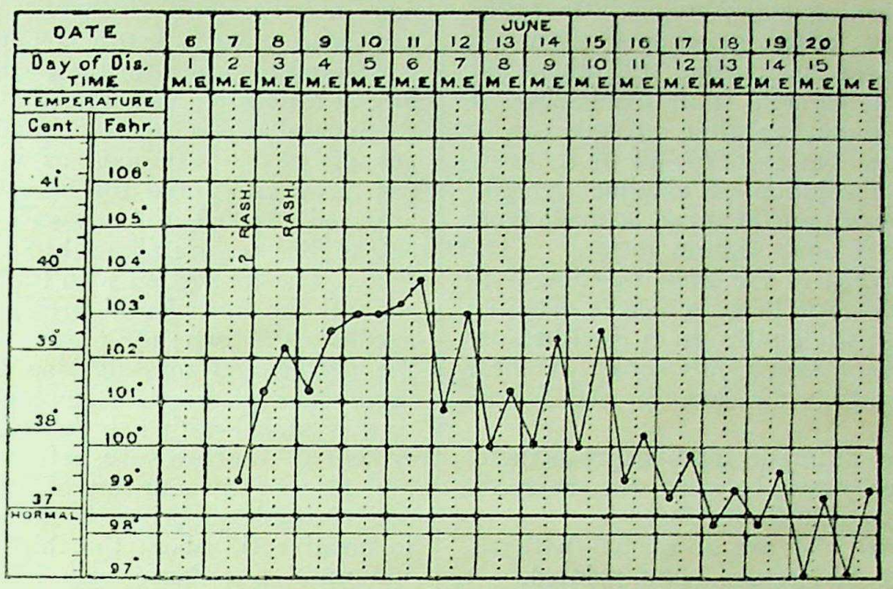
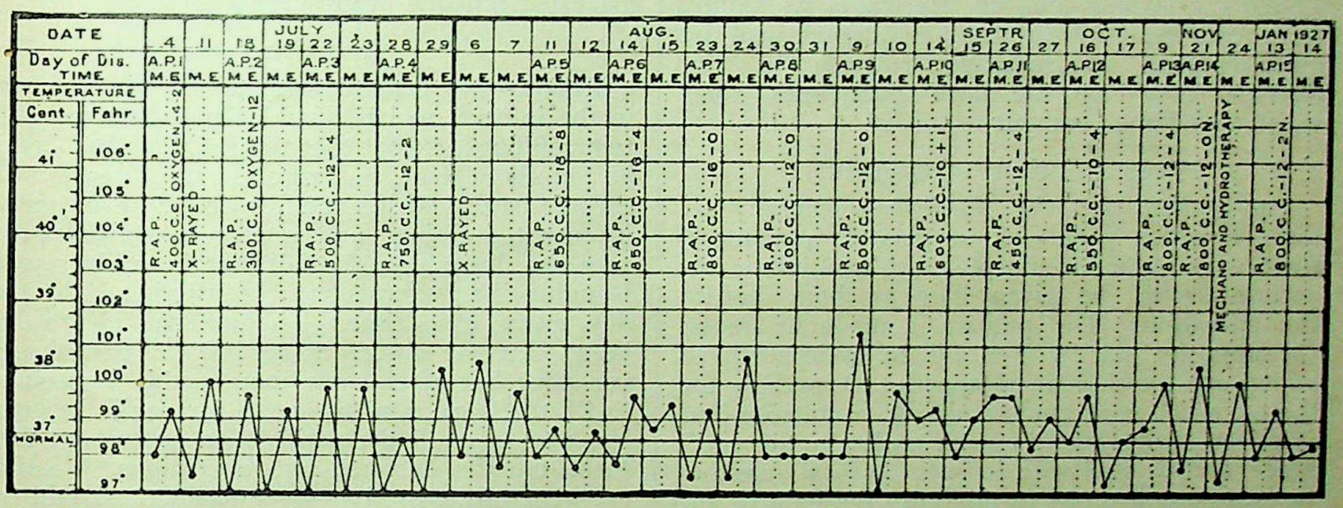
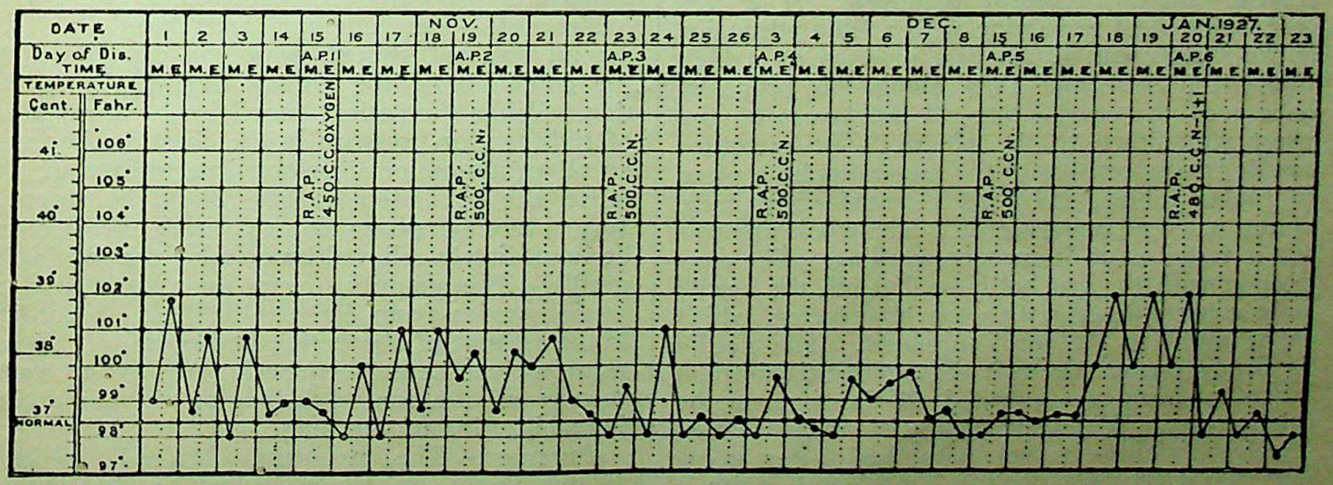
tor, all being connected by pieces of rubber and glass tubing; and I use atmospheric air filtered through sterile cotton wool just before it goes through the needle for injection into the pleural cavity. The flask and the bottle are connected by tubing at their lower part. One of them is graduated to measure the gas and is kept in a trough full of hot water so as to keep the gas at body-temperature; the other is filled with hot water or hot antiseptic solution. The stopcock of the bottle containing the gas is connected by means of a T or Y piece with the pneumothorax







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needle, the third arm of the T piece being in connection with a manometer which is graduated in inches or cms. and filled with coloured water.

There are various gases used. Some use oxygen at the first sitting and nitrogen afterwards from the cylinders; others generate oxygen and nitrogen both on the spot; while still others use air. Oxygen is generated from manganese or sodium peroxide (sodux); while nitrogen can be used; it is separated out from the air by its being sucked through a solution of alkaline pyrogallate which absorbs oxygen, or it can be made from ammonium chloride and sodium nitrate. The idea of using oxygen at the first injection is to prevent gas embolism in case the needle gets into a vein in the lung; while nitrogen is used because it is inert and very slowly absorbed. If these gases are not available air does as well for all injections.

There are also different types of manometer advised to differentiate between the reservoir pressure and intrapleural pressure.

The needles used also are of various patterns, some being sharp and others blunt pointed.

I think that a simple needle such as that in Potain's aspirator and an apparatus as simple as it can be, with proper precautions, will be quite as good for inducing collapse of the affected lung as the more complicated ones which sometimes get out of order.

TECHNIQUE OF OPERATION.

Preparation of the Patient.—Generally if there is much cough or in nervous patients a sixth of a grain of morphia by hypodermic injection should be given half an hour before the operation. The patient is made to lie on the opposite side with a pillow underneath to widen out the intercostal spaces. A part of the thorax which is resonant and free from adhesions is selected, preferably in the axilla in the sixth space, and painted with iodine. A local anæsthetic is advisable so as to minimise the pain of the puncture with a large needle and also the risk of pleural reflex or pleural eclampsia. A 2 per cent. solution of novocaine with a little adrenalin is quite sufficient. It is first injected as a bleb under the skin and then along the proposed course of the needle into all the layers of the chest wall down to the pleura. The puncture needle is connected with the apparatus by a piece of rubber tubing, and a glass cannula containing cotton wool, all being sterile. The whole apparatus is tested as to its proper working. The connection with the gas bottle is shut off, the needle only communicating with the manometer, which is adjusted to 0 (zero) pressure. The needle is firmly pushed through the anæsthetised tract, attention being concentrated all the time on the manometer. When the pleura is reached a distinct resistance is met with, and after going through it the entrance into the pleural cavity is shewn by the sudden record of a negative pressure of some 10 to 20 cm. of water by the manometer, with respiratory excursions of 4 to 6 cm. The excursions of fluid become more marked on deep breathing and coughing. Only after these infallible signs of the penetration of the needle into the pleural cavity are obtained, is one justified in proceeding further. The communication with the gas bottle is opened and the gas is allowed to flow into the pleural cavity slowly, first at a negative pressure of one half of that in the pleural cavity so as to minimise the risk of gas embolism. As soon as it is seen that the gas flows easily and the manometric excursions are well marked, the pressure is increased and 300 to 400 c.c. are allowed to flow in at the first time. The connection with the gass bottle is then cut off, the intrapleural pressure noted, and the needle withdrawn; the tissues are lifted up with the needle and massaged so as to prevent the occurrence of surgical emphysema. The puncture is sealed with a little collodion. A record is kept of the pressure before and after filling, and also of the amount of gas injected. It is not advisable to bring the intra-pleural pressure to positive till about the third filling, otherwise too rapid a collapse may lead to distress and dyspnœa and the squeezed out sputum may be aspirated into the healthy lung.

INTERVALS.

Refills.—No general rule can be laid down as to the interval which should elapse between each two refillings, except that the intervals had better be too short than too long. If the disease is of chronic nature with some fibrosis, more frequently repeated fillings and a more sustained pressure are desirable, especially in the early stages. Roughly the intervals may be lengthened by one day extra each time. The normal pleura has been shewn to absorb 80 to 100 c.c. of nitrogen per day; but after some months this is reduced to 25 to 50 c.c. and the need for refills becomes less and less, till the patients go on two or even three months between two operations. Refills are generally easy, but on no account should the precautions taken at the first filling against all possible dangers and complications be relaxed.

Amount.—The amount introduced at the second and subsequent occasions depends upon the condition of the patient during the operation. When the patient complains of any feeling of tightness or pressure in the chest, or becomes at all cyanosed or develops irregularity of the pulse, the admission of gas should be stopped. Any severe symptoms from positive pressure can be immediately relieved by opening the tap in the needle. The quantity of gas for a secondary injection varies from 300 to 1,000 c.c., according to the amount of absorption and capacity. *X*-ray examinations are frequently of great value throughout the course, indicating the amount of immobilization of the lung.

Pressure.—The pressure obtained at later fillings varies greatly according to the amount injected and the presence of adhesions. But when a positive pressure is attained, the increase should be steady and sustained till a good com-

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No.	Name.	Age.	Sex.	Affected clinically.	X-ray.
1	E. M. ..	..	M.	Left lung advanced (both lungs).	1st Left ape deposit 2nd Deposit more c 3rd Left lur
2	F. E. ..	29	M.	Left lung crepitations and ronchi at apex; right clear.	1st Slight lar, bu Left a 2nd Left lur
3	Mr, M. ..	28	M.	Right side: profuse hæmoptysis and fever	
4	Miss G. S. ..	23	F	Right advanced; left base, a little.	Same

or two, though sometimes it takes longer; the sputum for a time increases, from being squeezed

occur during refills are due to this. It soon subsides and reactions disappear.

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Table of Illustrative Cases.

No.	Name.	Age.	Sex.	Affected clinically.	X-ray. Findings	No.	No. of Injections. Date.	Amount.	Pressure.	Results.
1	E. M. ..	..	M.	Left lung advanced (both lungs).	1st X-ray. Left apex extensive deposit 8-9-1922. 2nd X-ray. Deposit both sides, more on the right. 3rd X-ray. Left lung collapsed.			Air.		
						1	10-1-23	400 c.c.	— 5 to — 1	On admission the patient was running a low temperature.
						2	16-1-23	500 „	— 4 to +0	After the 4th injection the patient was keeping almost normal temperature.
						3	23-1-23	600 „	0 to + 4	
						4	30-1-23	600 „	0 to 6 c.m.	Acute symptoms subsided and gained in general health.
						5	12-2-23	700 „	0 to 16 „	
						6	27-2-23	700 „	+ 8 to 20 „	Discharged on 20th June, 1923.
						7	17-3-23	700 „	+12 to 30 „	
						8	12-4-23	700 „	+ 6 to 12 „	
						9	2-5-23	600 „	3 c.m. to 20 c.m.	
						10	6-6-23	500 „	0 to 20	LEFT LUNG COLLAPSED ENTIRELY.
2	F. E. ..	29	M.	Left lung crepitations and ronchi at apex; right clear.	1st 9-3-23. Slight right alveolar, but extensive. Left apex deposit. 2nd 31-1-25. Left lung collapsed.	1	17-3-23	450 „	— 4 to 0	Not much pain on coughing.
						2	21-3-23	450 „	— 4 to 0	No pain, quiet.
						3	27-3-23	500 „	— 2 to 0	No pain, complains of cough.
						4	4-4-23	600 „	0 c.m. to +6 c.m.	Shivering slightly.
						5	18-4-23	600 „	0 „ „ +6 „	No pain, vomiting twice.
						6	16-5-23	600 „	— 1 „ „ +7 „	Comfortable.
						7	13-6-23	500 „	0 „ „ 7 „	Comfortable, less cough. X-ray the heart and the hilum displaced a little on the right, left lung collapsed. Discharged at own request on 14th September, 1923.
						8	27-6-23	500 „	— 4 to 0	
						9	18-7-23	600 „	0 „ 3 c.m.	
						10	22-8-23	750 „	— 2 „ +1 „	
						11	13-9-23	1,000 „	— 2 „ +3	
3	Mr, M. ..	28	M.	Right side: profuse hæmoptysis and fever	....	1	3-3-25	500 „	— 3 to —1	Patient began with profuse hæmoptysis and fever. Tubercle bacilli were found in sputum. Collapse of the right side was advised and done and after 3 injections bleeding entirely stopped and fever came down; all the symptoms improved and after the 6th there were no tubercle bacilli in the sputum, and patient felt much better. Right side of the lung was collapsed and then he stopped treatment after the 8th injection and went for a change.
						2	10-3-25	700 „	— 3 to 0	
						3	24-3-25	900 „	— 2 to 0	
						4	12-4-25	900 „	— 2 to 1	
						5	30-4-25	800 „	— 1 to 1	
						6	6-5-25	900 „	— 1 to 1	
						7	1-6-25	900 „	— 1 to —2	
						8	1-8-25	800 „	— 1 to —2	
4	Miss G. S. ..	23	F	Right advanced; left base, a little.	Same ..			Oxygen.		
						1	4-7-26	400 c.c.	— 4 to —2	Temperature began to settle down from 101° to 98° after the 4th injection, and kept normal, but there were disturbances due to menstrual periods. and then went up to 100° for a few days.
						2	18-7-26	300 „	—12 to 0	
						3	22-7-26	500 „	—12 to —4	
						4	28-7-26	750 „	—12 to —2	
						5	11-8-26	650 „	—18 to —8	
						6	14-8-26	850 „	—16 to —4	*Night Sweats.*—Which were harassing entirely disappeared, cough was much less and the disturbance during the sleep also disappeared.
						7	23-8-26	800 „	—16 to 0	
						8	30-8-26	600 „	—12 to 0	
						9	9-9-26	500 „	—12 to 0	
						10	14-9-26	600 „	—12 to +1	*Sputum.*—Quantity first increased. but later on much diminished. *Tubercle bacilli* were fewer later.
						11	26-9-26	450 „	—12 to —4	
						12	16-10-26	550 „	—12 to —4	
						13	9-11-26	800 „	—12 to —4	*Weight.*—Kept stationary but later on diminished a little. *X-rays* showed collapse of the right lung and only slight opacity at the base of the left lung, where there is a great improvement also.
					Nitrogen ..	14	21-11-26	800 „	—12 to 0	
					„ ..	15	13-1-27	800 „	—12 to 2	
5	Indirabai Deshmukh.	22	F.	Right lung advanced crepitations and rales. Dullness, harsh breath, left lung.	Marked opacities right lung.	1	15-11-26	450 „	— 2 to 0	Pain, troublesome cough, profuse sweating.
								Oxygen.		
						2	19-11-26	500 c.c.	— 2 to 0	Pain in chest for 3 days. Temperature Resp. fairly well.
								Nitrogen.		
						3	23-11-26	500 c.c.	— 2 to 0	No pain, temperature normal, less cough, comfortable.
						4	3-12-26	500 „	— 3 to 0	No discomfort, expectoration scanty, gain in general health.
						5	15-12-26	500 „	— 2 to 0	
						6	20-1-27	480 „	— 1 to +1	Still in wards under treatment.
6	W. P. Pneumothorax and thoracoplasty.	29	M	Left lung crepitations and pain. Few crepitations at right apex, temperature 101° Cough, sputum plus.	1st 31-12-22. Extensive disease and cavities on left side. 2nd 20-3-23. Pneumothorax nearly complete collapsed lung seen by the right side of heart. 3rd 31-7-23. The heart and the hilum displaced in right; left lung collapsed at the level of the nipple. 4th 21-8-23. Screen examination. fluid at level. 5th 18-12-23. Heart displaced in the right; fluid at the 4th rib left side. 6th 28-1-24. X-Ray Examination 7th 4-2-24. X-Ray Examination.	1	1-11-22	400 „	— 3 to —1	Patient's condition was not good on admission, but as he had extensive unilateral disease on the left side it was compressed. He was much better and the symptoms greatly improved after collapse, but fluid appeared on that side, which was repeatedly aspirated and air put in afterwards, but as it became purulent and the temperature became hectic he was advised thoracoplasty. Drs. Dalal and Cooper did the rib resection on two occasions and after a prolonged illness of about 2 years patient felt better, temperature was normal, the whole of the left side was flat and healed up, and patient put on flesh and weight and is now quite healthy, doing work.
						2	7-11-22	550 „	— 3 to 0	
						3	13-11-22	600 „	— 2 to +1	
						4	20-11-22	800 „	— 2 to +2	
						5	1-23	.750 „	— 1 to +3	
						6	1-23	800 „	0 to 4	
						7	30-1-23	600 „	0 to 5	
						8	2-23	600 „	0 to 6	
						9	20-2-23	500 „	+ 3 to 7	
						10	21-3-23	400 „	+ 4 to 7	
						11	2-5-23	400 „	0 to 7	
						12	13-7-23	300 „	0 to 7	
						13	28-8-23	30 ozs. of	fluid aspirated	
						14	18-9-23		do.	
						15	13-10-23			
						16	14-11-23			
						17	21-11-23			
						18	3-1-24	(Ribs	Resected.)	
						19	5-3-24	(Operated)		

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meter, with respiratory excursions of 4 to 6 cm.

should be steady and sustained till a good com-

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pression is obtained with about 10 to 15 c.c. of water. The pressure obtained and the patient's sensations are of more importance than the quantity of gas introduced.

DURATION.

On an average the injection has to be made 16 to 20 times, which may take from one to two years. I do not mean by this that the patient has to stay for two years in the hospital; but when once the pneumothorax is complete and the diseased lung well-collapsed and the patient is well and up and about, which generally takes about 4 to 6 months, he can go out of the hospital for light work in healthy surroundings. He then reports himself for observation and refill, if necessary, to keep up the pressure. The absorption of nitrogen is slower, and intervals grow longer as compression becomes well established. It is better to keep him in bed for a few hours after the refill and then he can go out on the same day. After two years the healthy portion of the lung may be allowed to expand, but it is better to keep the patient under observation for some years in case the healed focus breaks down. It is well to warn the patient of the dangers of too early discontinuance of the treatment after the symptoms have disappeared, as the chances of relapse are great if compression is not maintained till the stage of anatomical recovery.

This brings us to the question of "How pneumothorax therapy acts." Various explanations are given of the benefit which follows the collapse of the diseased lung, and the following seems to meet the case best.

(1) Simple mechanical influence by immobilisation, which is known to be very effective in tubercular disease of other parts of the body. With this immobilisation, there occurs also a marked reduction in the quantity of harmful fluids which are present in the lung; the walls of the cavities come together and unite, and the diseased parts get fibrosed.

(2) Influence on the general constitution by the removal of harmful toxæmia; general health, muscle tone and appetite improve, and the patient feels much more cheerful. At the same time excessive focal reactions are diminished and the spread of the disease checked.

Dr. Riviere, under whom I had an opportunity to work as a clinical assistant for some time, describes three stages through which cases of artificial pneumothorax pass and insists that the treatment should be continued through all these. These are:—

(1) The stage of disappearance of symptoms.
(2) The stage of clinical recovery, and
(3) The stage of anatomical recovery.

The Disappearance of Symptoms.—These are noticed first and are often very striking, even theatrical. They are generally expected from a measure which closely simulates the excision of a diseased organ; the fever disappears in a day or two, though sometimes it takes longer; the sputum for a time increases, from being squeezed out of the collapsing lung, then diminishes, becomes mucoid and, together with cough, may cease altogether. This loss of cough and sputum is perhaps more convincing to the patient himself than anything else. He generally gradually improves, though the weight may be slow in responding. It is a particularly happy and striking point about this therapy that it soon enables the patient to return to a more or less normal existence.

The Stage of Clinical Recovery.—After a time this stage is reached and the patients think they are cured, but this is a mistake. They should be induced to continue the treatment till the stage of anatomical recovery is complete. This means a true healing of the diseased lung, which takes some time and its achievement is difficult to determine. Only then can the diseased lung be safely allowed to re-expand. This time necessarily varies with the amount of disease originally present. One or two years is the least required for safety. One would wonder what sort of an organ it appears when a lung so long collapsed is allowed to re-expand. It is quite certain that a fully functionating lung may be and often is regained. Forlanini has recorded a case where one lung was kept collapsed for 8 years, yet after re-expansion it was able to do the whole work, while the other was compressed for disease of the opposite side.

Dangers of Complications.—So far I have described the brighter aspects of the operation, but like other operations this has its dangers also. I have not seen any of the major accidents which somewhat clouded its early history, and I can say with confidence that with proper precautions one is hardly confronted with them. I have given some hundreds of injections during the last 12 years but have not had a single accident. Gas embolism is a great danger, which is to be avoided by intelligent observation of the manometer, and according to some by the use of oxygen at the first operation. Some also advise a special needle, but although we used air or nitrogen and Saugman's needle all the time we had no case of gas embolism. The safety of the patient really depends upon the continued observation, during the whole time of the operation, of the rhythmical rise and fall of the fluid in the manometer with the movements of respiration.

The so called pleural reflex is an accident which may occur in this form of puncture, as well as in the ordinary tapping for effusion; and anæsthetising of the pleura may prevent it. Asphyxia and syncope are due to large injections. I have seen one case suddenly developing cyanosis and asphyxia during the course of filling up, saved by immediate injection of strychnin. These dangers will be minimised if constant attention is kept on pulse and respiration, as to their rapidity and regularity. Pleurisy, with or without effusion, also occurs during the course of treatment and the reactions as regards fever etc., which occur during refills are due to this. It soon subsides and reactions disappear.

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Conversion of an artificial pneumothorax into a natural pneumothorax by giving way of a weak spot in the lung has occurred in some cases; these require care in refilling. An empyema may also occur and may require aspiration and refills, or thoracoplasty. Surgical emphysema in various cellular spaces may also follow, but the air gets gradually absorbed.

Thoracoplasty.—This operation for diminution of the volume of the thorax on the affected side by means of resection of portions of ribs is another method of collapse therapy for dealing with these one-sided cases, where artificial pneumothorax cannot be induced owing to adhesions, or where there has been recurrent simple or purulent fluid, and in some cases of natural pneumothorax. It is also useful in fibrotic cases and cases with extensive cavities. For this operation also the disease must be mainly unilateral. I have had only one case in the series given; this was after a failed artificial pneumothorax. The final result is excellent and the patient is in perfect health. For the technique etc. of the operation a competent surgeon should be consulted and operation performed in conjunction with him.

I believe that collapse therapy has a great future before it and I should like to urge its recognition as a form of treatment which has revolutionised the outlook of cases of phthisis which are past the early stages. Every such case should be considered carefully with this end in view. Markedly one-sided cases and cases with repeated hæmoptysis should all be given the chance. Even if an operation once initiated has to be abandoned, or if the attempt to produce it fails, the patient is no worse off than he was before. On the other hand, some of the advanced cases have been given several months of comfortable life when no more than temporary relief from symptoms can be hoped for. Some people are very sceptical about it and say the cases requiring treatment are very limited and the operation does not solve the problem of curing phthisis, because the underlying difficulty in phthisis is a complete breakdown of the immunising machinery and there is always a chance of relapse, but however the case may be, I think if there is the possibility of deriving benefit in any cases by the induction of pneumothorax, which helps us not only to reduce the toxæmia and other symptoms, but gives time to improve the patient's resistance by ordinary hygienic methods, the treatment should be adopted. So let us not forget to give to such cases, otherwise for the most part hopeless, this chance of improvement. In conclusion I heartily concur with the statement made by one well qualified to do so that artificial pneumothorax is the greatest advance in the treatment of pulmonary tuberculosis made in the last twenty years.

Conclusions.

(1) There is a very great prevalence of pulmonary tuberculosis in the big cities in India, and hence there is scope for every form of scientific treatment for some of the cases.

(2) Considering the various conditions mentioned above, the percentage of cases suitable for some form of collapse therapy is as high as that in Europe, i.e., about 10 per cent.

THE ANTIMONY TEST IN THE DIAGNOSIS OF KALA-AZAR.

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The standard of precipitate formation with the Antimony test.

SINCE the publication of our paper on the antimony test for the diagnosis of kala-azar in the *Indian Medical Gazette* last June, this reaction has been extensively used in Calcutta for the diagnosis of this disease. We have further extended our observations and gained information which will be of interest to the medical profession in this side of India. We would like to point out at the outset that there has been a certain amount of misapprehension regarding the standard of precipitation for the test to be considered as positive. Not infrequently sera appear to have been returned as positive whenever any sort of precipitate is produced by bringing a solution of an antimony compound in contact with the serum or oxalated blood in a Dreyer's tube. We would like particularly to emphasize the fact that all cases in which a mere precipitate is formed are not necessarily positive reactions, as given by kala-azar sera; the flocculent appearance of the precipitate is of prime importance, and unless flocculation is quite marked and evident, the test should not be considered positive. We have found it convenient to divide all the sera into four groups. (1) Strongly positive sera (+ + +). Under this heading are included all the sera from patients in whom the disease is well advanced. The precipitate here forms immediately and is thick and flocculent and once seen there cannot be any doubt about it. The precipitate conglomerates into a thick mass, generally at the junction of the serum and antimony solution and is difficult to break by shaking the tube. The precipitate is also insoluble and will not dissolve if the tube is kept for 24 hours or even longer. (2) Positive sera (++ or +). In this class are included those sera in which a definite flocculent precipitate forms, but the precipitate is not so thick as in the first group. These are generally early cases of kala-azar of 1 to 2 months' duration. In this class, the precipitate is obviously flocculent and as a rule there is little need for doubt. The precipitate has the same tendency to collect together into a mass at the junction of the two fluids, though the mass is not

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so thick. The precipitate sometimes settles at the bottom of the tube and is quite insoluble after 24 hours. With the blood test the flocculation in these two classes of sera is also quite marked and cannot be missed. If, however, there is any doubt, examination with an ordinary magnifying glass will soon verify whether it is flocculent or not. (3) Doubtful sera (±). Under this category come the sera in which definite precipitate, or in some cases varying degrees of haziness, appear at the junction of the two fluids. The precipitate or haziness, however, has not a flocculent character. This precipitate is often noticed in such conditions as chronic malaria, leukæmia and infectious diseases, such as tuberculosis, leprosy and syphilis, etc.; all these being accompanied by a great deal of disturbance of metabolism and changes in the constituents of the serum. If the tubes are allowed to stand for a few hours sometimes the precipitate entirely dissolves; these cases are generally definitely not kala-azar. In other cases the precipitate still remains, even after 24 hours, and these may be early cases of kala-azar. In the latter, signs of flocculation may be seen on careful examination with magnifying lens. These latter cases should all be looked upon with suspicion as there is possibility of their turning out to be kala-azar. The blood test with this class of sera gives an unmistakable haziness but no definite flocculation. (4) Totally negative sera (—). In this group are included those sera in which no precipitate whatever is formed and there is not even a slight haziness at the junction of the two fluids. These are generally the sera from perfectly healthy individuals and from those suffering from a majority of other diseases. The blood test also in these cases remains perfectly clear.

It will be seen from the above that there is a class of sera which may give a positive or a doubtful antimony test. To differentiate these sera from typical kala-azar sera we have adopted a method of simple dilution of the serum with 8 to 10 times its volume of distilled water in the way it is done when doing the Widal reaction. This diluted serum is tested in the usual way with a 4 per cent. solution of an organic antimony compound, such as urea-stibamine. In advanced kala-azar cases a distinct white flocculent precipitate appears immediately at the junction which settles down at the bottom of the tube in a short time. Non-kala-azar sera give no such precipitate.

The blood test which we have described (*Indian Medical Gazette*, August 1927) is also more sensitive in this respect, and if properly carried out and the flocculation carefully observed, some of the doubtful cases (with the serum test) can be easily eliminated.

There is another point which should also be borne in mind when performing this test, and that is that the different brands of urea-stibamine and allied compounds put on the market are not absolutely uniform in their composition. We have at least on two occasions during the last few months come across batches of these compounds though physically differing very slightly from the good drug, which gave a precipitate even with perfectly healthy sera when they were brought in contact with it. When this is the case it can easily be detected by testing a few healthy bloods, and if a precipitate is formed, the particular compound should be rejected for use.

Diagnostic value of the Antimony test.

Our further observations in connection with this test lead us to confirm the views we have already expressed about its diagnostic value in the previous papers we have published. In the following table we give a resumé of sera from suspected kala-azar cases in the kala-azar and general out-patient departments of this School. The test was performed on these patients and the diagnosis confirmed later by other methods.

A perusal of Table I will show that out of 256 kala-azar sera examined, 235 gave positive antimony reactions and 21 gave doubtful reactions: the same sera tested with the aldehyde test gave 184 positive, 40 doubtful and 32 negative reactions. In malaria, syphilis, leukæmia and tuberculosis the antimony test gives a slightly larger number of positive reactions than the aldehyde test, in leprosy, skin diseases the balance is slightly in favour of the antimony test. In filariasis, dysentery, epidemic dropsy, sprue and healthy sera the honours are equally divided. It will be seen that the antimony reaction is more sensitive than the aldehyde reaction and, therefore, gives more positive reactions with kala-azar sera; their diagnostic value in excluding non-kala-azar cases is about equal, the differences being so small that one can hardly draw any definite conclusions one way or the other. We would like to point out in this connection that we had not discovered the value of the "dilution method" till lately so that in the majority of these sera this was not applied. The use of this method will undoubtedly increase the value of the antimony reaction in excluding non-kala-azar sera.

We have further been able to satisfy ourselves from observations on a large number of sera that the antimony reaction appears much earlier than the aldehyde reaction. Out of the 3 patients examined between the 10th and 12th day of the disease all gave negative aldehyde but doubtful antimony reaction; out of the 12 patients examined between 15th and 21st day of the disease all 12 gave positive antimony, but negative aldehyde reaction. All these were confirmed by positive peripheral blood cultures for flagellates. Of the 30 patients in which the disease had lasted from 1 to 3 months all gave positive antimony reaction, while only 4 gave a doubtful aldehyde reaction and 26 were entirely negative.

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TABLE I.

	No. of cases done.	Antimony test.			Aldehyde test.			REMARKS.
		+++ ++	±	—	+++ ++	(+) ±	—	
Kala-azar ..	256	235	21	0	184	40	32	Out of the early cases, 16 gave positive blood culture for flagellates, 18 positive spleen puncture, the rest were diagnosed by clinical and other findings.
Malaria ..	54	7	18	29	3	20	31	Diagnosed from negative spleen puncture findings and majority with malarial parasites in the blood ; positive cases were chronic malaria with enlargement of spleen.
Leprosy ..	55	5	4	46	7	6	42	This series includes 10 cases of advanced leprosy which were particularly selected by Dr. Muir as giving a positive aldehyde reaction.
Syphilis ..	15	0	2	13	0	0	15	W. R. was strongly positive in all.
Skin cases e.g, dermatitis, leucoderma, sarcoides, etc.	20	0	2	18	0	5	17	From Col. Acton's Skin Out-patient Department.
Lucæmia ..	6	2	0	4	0	6	0	
Tuberculosis ..	9	4	0	5	0	4	5	4 cases which gave positive antimony test and doubtful aldehyde reaction were advanced (moribund) tuberculars.
Filariasis, dysentery, epidemic dropsy, sprue and normal healthy cases.	66	0	0	66	0	0	66	
TOTAL ..	481	253	47	181	224	79	208	

N.B.—The aldehyde reactions in most cases were done by ourselves, and it is quite possible that our standards were not exactly the same as Dr. Napier's.

Variations in the Antimony test during the course of Antimony injections.

We have also carried out systematic observations as to the variations which take place in this reaction after injection of the antimony compounds administered to kala-azar patients for the treatment of their disease. Table II gives a resumé of our observations in this connection.

TABLE II.

Variations in the antimony test during treatment.

No. of Cases.	No of injections.	ANTIMONY TEST.			
		+++	+	±	—
8	1	8	0	0	0
8	2	8	0	0	0
8	3	8	0	0	0
8	4	8	0	0	0
8	5	8	0	0	0
11	6	11	0	0	0
11	7	11	0	0	0
10	8	10	0	0	0
8	9	8	0	0	0
8	10	8	0	0	0
6	11	6	0	0	0
5	12	2	1	2	0
4	13	1	2	1	0
2	14	0	1	1	0
2	15	0	1	1	0
2	16	0	1	1	0

The method adopted was to test the blood of patients receiving antimony injections in the hospital on the day following each injection. The drug used in all these cases was *urea-stibamine.* A perusal of the table will show that generally, up till the 10th or 11th injection, the antimony test remains unaltered. After that the strongly positive reaction of the blood begins to alter, i.e., becomes positive or doubtful. Our series of cases unfortunately is not large enough to draw any definite conclusions as to whether the reaction could be used as a criterion of cure of the disease, but they certainly show a tendency in that direction. Napier considers that as a rule 10 to 15 injections, of one of the new organic antimony derivatives such as urea-stibamine or the Von Heyden compounds, are necessary to cure the disease. It is a curious coincidence that the change in the reaction of the serum to the antimony test begins about that period.

The Antimony test in Dermal Leishmaniasis.

We have also investigated how cases of dermal leishmaniasis reacted to the antimony test. Through the kindness of Lt.-Col. H. W. Acton, I.M.S., we were able to examine 30 cases of this disease of varying degrees of severity. Twenty-nine patients out of this series gave an absolutely negative reaction, only one giving a strongly positive reaction. In this latter case there was slight enlargement of the spleen and cultures of the peripheral blood showed growth of the flagellates. It would appear from this that in cases of dermal leishmaniasis there is not such a great disturbance of metabolism as in cases of visceral leish-

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maniasis, and that the blood in the former disease does not undergo such marked changes as in the latter disease.

Discussion.

The antimony test for the diagnosis of kala-azar is dependent on the alterations in the composition of the blood produced by the disease. The alterations which take place in the blood and bring about these changes we hope to deal in a separate paper; but it may be mentioned here that our observations lead us to conclude that probably it is in the euglobulin content of the serum which is increased and which is responsible for the formation of the flocculent precipitate. Whether this increase is brought about by changes produced in the normal metabolic processes of the body due to the disease, or whether it is due to the introduction of foreign protein from the disintegration of the parasites it is difficult to say. The fact that a strongly positive test may occasionally be obtained in conditions other than kala-azar may possibly point towards the former view. In the patients one meets with in Bengal, however, it is not possible definitely to exclude *Leishmania* infection. We have, therefore, undertaken to do the test on a large series of cases in an area where kala-azar is not endemic and the results will be published in due course.

Summary and conclusions.

(1) In performing the antimony test for the diagnosis of kala-azar the flocculent appearance of the precipitate is of prime importance, whether the test is done with the serum or oxalated blood. When the serum is used for the test, in positive cases the precipitate collects together into a mass at the junction of the two fluids. This mass does not break up on shaking and does not dissolve if the tube is allowed to stand for 24 hours.

(2) Further observations on a large series of kala-azar and non-kala-azar cases confirm the value of the test as a diagnostic measure for kala-azar. Our results show that the antimony reaction is more sensitive than the aldehyde reaction and therefore gives more positive reactions with definitely kala-azar sera. The difference in their diagnostic value in excluding non-kala-azar sera appears to be very small.

(4) The reaction appears much earlier than the aldehyde test; generally sera from patients obtained on the 15th to 20th day of the disease give a positive reaction.

(5) The variations produced in the test during the course of treatment of the disease with antimony injections have been worked out. The test remains positive up to the 10th or 11th injection and then begins to become less marked. Our series of cases is at present too small to draw any definite conclusion, but they tend to show the possibility of the test being used as one of the criteria of cure of the disease.

(6) In dermal leishmaniasis the test is as a rule negative.

We have much pleasure in expressing our gratitude to Lt.-Col. H. W. Acton, I.M.S., the officiating Director of the School, for his help and for giving us facilities to work out this test in the Out-patient Department, as well as in the Carmichael Hospital for Tropical Diseases.

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THE TREATMENT OF BUBONIC PLAGUE BY INTRAVENOUS INJECTIONS OF ANTI-PLAGUE SERUM.

By A. S. DAWSON, L.M.P.,

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PRIOR to the vey successful results obtained by the introduction of this valuable remedy, medical practitioners had to depend on such germicidal agents as tincture of iodine, hypertonic saline solution—as it is called, and much talked of by observers who happen to be medical men of repute. We are told that the iodine does its work by inducing "leucocytosis," which in turn kills the *Bacillus pestis;* whilst intravenous hypertonic saline does its work by diluting the toxins of the plague germ, or possibly again by inducing leucocytosis, which in its turn kills the *Bacillus pestis,* wherever it may be. We have noticed some good results to follow both these lines of treatment, but plague caused by the *Bacillus pestis* is a septicæmia, and the high fever associated with the disease means that the blood is loaded with toxins. Hence the most direct method of combating this very fatal disease is by introducing into the blood stream such remedies as anti-plague serum. After considerable experience of plague, my method of treating the disease is as follows:

As soon as one knows the case to be one of plague, there should be no hesitation in giving an intravenous injection of 30 to 40 c.c. of anti-plague serum, and a further dose of 20 to 60 c.c. of the same serum into the cellular tissue of the abdomen, or into the inner aspect of the thighs or the flanks—whichever site may be most suitable. The dosage of serum given may depend on the temperature of the patient, but no hesitation should occur in spite of even a very high temperature, such as 106°F.

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Immediately following on the injection, within six hours the temperature will fall to normal or to 99°F., and the results are so encouraging that even if you see the patient on the first day of disease and in an unconscious condition, you may hope to save his life. I am emphatic in saying this, as this is my experience in this town of Thonze, where I have dealt with more than 200 cases of plague during the epidemic years 1924-25-26-27. Of 50 cases which I first saw in a moribund condition I have a record of 16 cases successfully treated by this method, but others were past recovery under any line of treatment when first seen. Sometimes cases which appeared to be hopeless recovered within 24 hours.

One important point to bear in mind in administering this remedy is that, at the time of reaction when the temperature is very rapidly dropping to normal or sub-normal with profuse sweating, the patient's relatives should be warned that fatal cardiac collapse may supervene if the patient sits up, or tries to move. Absolute and complete rest in bed is indicated, and even turning on one side or the other without assistance should be debarred, as the heart is very weak in plague—a special and peculiar feature of this disease. In all cases of plague the tendency to sudden heart failure is most marked, and a stimulant heart tonic is always indicated. I usually administer the following prescription:

℞

Liquor adrenalin hydrochloride (P. D. & Co.)	.. ..	m xxxx
Tincture digitalis, (P. D. & Co.)	..	m xxx
Spirit. ammon. aromat., B. P.	..	m xxx
Aquam	.. ..	ad oz. 1.

to be administered every third hour, or as often as necessary, even every second hour. The Parke Davis and Co.'s tincture of digitalis appears to be more reliable than any other, and it is most essential that such a tincture shall be fresh and potent. Old stock tincture of digitalis in the tropics is very liable to have deteriorated and to be useless.

The serum which I have used was that obtained from the Pasteur Institute of Paris, obtained through Messrs. E. M. de Souza and Co., Rangoon. The success of this treatment very largely depends upon the freshness of the serum, and the fresher the serum, the better the results with it.

The following is a list of 6 out of 16 cases in which administration of this "Anti-Pestaux serum" appeared to me to have saved life.

Case No.	Name.	Caste and age.		Highest temperature.	Lesions present.
1.	Kaffiadir	Hindu	19 years	105°F.	Gland in right axilla.
2.	Vellyan	Hindu	20 „	106°F.	Right femoral glands.
3.	Hawabi	Mahomedan	4 „	103°F.	Glands in right axilla.
4.	Sadiq	Mahomedan	17 „	103°F.	Right femoral glands.
5.	Grace X	Indian Christian	6 „	106°F.	Glands in right axilla.
6.	ma Ni	Karen Christian	24 „	103°F.	Right femoral glands.

My experience with anti-plague serum has been so satisfactory, and I have seen so few references to this line of treatment in your journal, and in other journals dealing with tropical medicine, that I am prompted to send in these few notes.

UREA STIBAMINE SOLUTION AS A TEST IN KALA-AZAR.

By ATINDRA NATH SEN, M.B.,
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MAJOR CHOPRA'S test in kala-azar has been tried by me on the serum of patients suffering from various diseases. I have been able to study the test on 42 cases only. It is too early to pass any positive opinion as to the certainty of the test in kala-azar, but from what I have gathered from my personal observations, I am sure that, with proper application, it will clear our doubts in most cases. I cannot say it is better than the globulin test. The advantage, however, is that the result of the test is visible in a few minutes and quite distinctive. The procedure is simple and can be carried out by anyone in the *mofussil*.

Technique.—All my cases were tried with a standard solution of urea stibamine, 0.1 gram dissolved in about 3 c.c. of distilled water. The solution was stocked in a blue phial fitted with a medicine dropper, and it kept very well for over 7 or 8 days. Even after that time the solutions gave the tests quite satisfactorily.

The blood of the patient (about 2 c.c.) was obtained by a Record syringe from one of the antecubital veins. The syringe was cleansed in rectified spirit and was used after the spirit evaporated. The blood was ejected into wide test tubes which were usually kept immersed in cold water. About an hour or two after, the clear serum having separated, was poured or pipetted out into finer narrow test tubes. If the serum is slightly tinged red this does not interfere with the test. The urea stibamine solution was then dropped slowly into the narrow test tubes, held in a slanting position. The solution was always found floating on the top of the serum. Out of the 22 non-kala-azar cases I tested, in 10 cases at the junction of the two liquids a thin pale precipitate was formed. The precipitate, however, does not permeate through the urea stibamine solution, nor is it white. It forms a sort of thin pellicle at the plane of contact. In the serum of kala-azar cases the precipitate is thick, heavy, and of a white curdy type, appearing either instantly or within half a

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minute. I have called the reaction + + + whenever it was heavy and dense, and + + if the precipitate was dense, but not settling to the bottom within an hour or so. But the clear urea stibamine solution was permeated in both cases by a turbid white precipitate. With the sign + + I never mean the test as only partially positive. It was definite, but the reaction was slightly less marked.

Of the 42 cases tried by me, 20 were positive cases of kala-azar, corroborated by blood examinations, the globulin test, history, and the results of antimony injections. Of these 20 cases, 9 gave a + + reaction and all the other 11 gave + + + with the urea stibamine solution. The globulin test was positive in 13 and partial in 2 cases. This test was not done in 5. The urea stibamine solution test was absolutely negative, i.e., no precipitate of any kind was formed, in 12 cases out of the 42 cases tried. Of these 12, one was a cured kala-azar patient (No. 27). He received 26 injections of urea stibamine last year. He looked quite healthy though he had an enlarged spleen, and had been quite free from fever for over six months. Case No. 38 also deserves notice; she had 15 injections of urea stibamine. She seldom gets any fever now but has come for ascites with cirrhosis of the liver. She gave the reaction + +.

In 4 cases out of the 22 non-kala-azar ones, Nos. 14, 16, 34, and 35, I observed a + + reaction in the first three, and + + + (twice examined) in the last. No. 14 was a case of ankylostomiasis, and the other three were all tuberculosis of lungs. None of the above cases had any spleen or liver enlargement. The globulin test was not done in the first two, but was positive in the latter two.

One thing however which I noticed in most of these reactions was the setting like a jelly of the serum and the urea stibamine solution. This has nothing to do with the test. I submit below a list of the patients in my wards in the Campbell Hospital, on whom the tests were observed. The blood examinations were done by my colleague Dr. J. N. Maitra, M.D., Teacher of Pathology, in his laboratory, for which I am highly obliged.

Case No. 1.—Rukini, H. F., aged 45. Epidemic dropsy for about six months. Heart dilated. General anasarca anæmic.

Hb—40%,	R. B. C.	2,900,000
	W. B. C.	1,400
	Polymorphonuclear	41%
	Lymphocytes	55%
	L. M.	4%
	U. S. reaction	— Very slight.

Case No. 2.—Jugal, H. F., aged 30. Epidemic dropsy for over 4 months. Heart dilated, enlarged liver, spleen normal.

Hb—46%,	R. B. C.	3,400,000
	W. B. C.	3,000
	P. M.	58%
	Lymph.	38%
	L. M.	4%
	U. S. reaction	Very slight.

Case No. 3.—Radha, H. F., aged 38. Rheumatism with swelling of knee, elbow and shoulder for about a week. Spleen and liver were normal.

U. S. reaction .. — Very slight.

Case No. 4—Kiron, H. F., aged 30. Fever for over 5 months; irregular at intervals of 4 or 5 days, spleen + + +. Liver enlarged; primary chancre on vulva, suspected case of kala-azar. Patient left hospital.

U. S. reaction + +.

Case No. 5.—Mona 23, H. F., kala-azar. Spleen + + + Liver +, had 2 injections of Sod. Ant. Tart. Very anæmic.

Hb—14%,	R. B. C.	800,000
	W. B. C.	2,400
	P. M.	58%
	S. M.	38%
	L. M.	2%
	Eosino	2%

U. S. reaction + +

Globulin test — — Partial.

Case No. 6.—Shoila, H. F., 32. Hemiplegia for a year. Liver and spleen normal.

Hb—50%,	R. B. C.	3,500,000
	W. B. C.	5,600
	P. M.	60%
	S. M.	36%
	L. M.	4%

U. S. reaction — absolutely negative.

Case No. 7.—Suniti Bala, H. F., aged 30. Fever 1 year. Spleen + + + +.

Liver + kala-azar.

Hb—26%	R. B. C.	1,900,000
	W. B. C.	800
	P. M.	50%
	S. M.	46%
	L. M.	4%

U. S. reaction + +.

Globulin +.

Case No. 8.—Priya Bala, H. F., aged 25. Spleen and liver normal. Vague symptoms of palpitation, anorexia, etc.

W. R. moderately positive.

U. S. reaction — — — — absolutely negative.

Case No. 9.—Kamala, H. F., aged 6. Malaria: Fever for some days spleen not enlarged. Yielded to quinine injection.

Hb—42%	R. B. C.	2,900,000
	W. B. C.	3,800
	P. M.	60%
	S. M.	32%
	L. M.	8%

B. T. malaria parasites. Widal negative 1 in 20.

U. S. reaction — absolutely negative.

Case No. 10.—Budhu, H. M., aged 8. Typhoid fever. Spleen and liver both slightly enlarged.

Hb—44%,	R. B. C.	3,300,000
	W. B. C.	7,000
	P. M.	58%
	S. M.	40%
	L. M.	2%

No malaria parasite. Widal + 1 in 100.

U. S. reaction — — absolutely negative.

Case No. 11.—Janab Ali, M. M., aged 30. Kala-azar. Spleen was + +. Crepitation at right apex.

Hb—46%,	R. B. C.	3,200,000
	W. B. C.	22,000
	P. M.	52%
	S. M.	44%
	L. M.	4%

U. S. reaction + +.

Globulin test +.

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Case No. 12.—Surendra, H. M., aged 37. Spleen + +. Liver +. Bowels loose: Kala-azar.

Hb—40%,	R. B. C.	2,600,000
	W. B. C.	2,600
	P. M.	45%
	S. M.	44%
	L. M.	3%
	Eosino	8%

U. S. reaction + +.
Globulin test +.

Case No. 13.—Fazel, M. M., 35. Kala-azar: Spleen + +. Anæmic, fever about ten months.

Hb—36%	R. B. C.	2,400,000
	W. B. C.	1,200
	P. M.	44%
	S. M.	54%
	L. M.	2%

U. S. reaction + +.

Case No. 14.—Umed Ali, M. M., aged 36. General anasarca about five months. Very anæmic. Ova of ankylostoma found in stools: spleen and liver normal.
U. S. reaction + +.

Case No. 15.—Sahadeb Ghosh, H. M., aged 38. Cirrhosis of liver. Ascites. No history of hæmoptysis; about 6 months ill.
U. S. reaction — — — very slight.

Case No. 16.—Sweeper, M. M., aged 20. Tuberculosis of lungs, right apex: anæmic. Spleen not at all enlarged. History of hæmoptysis.
U. S. reaction + +.

Case No. 17.—Ram Polay, H. M., aged 25. Fever for about a week, influenza, spleen and liver normal. History of syphilis. Chancre about 8 years ago.
U. S. reaction — absolutely negative.

Case No. 18.—Gulzari, H. M., aged 30. Influenza. Fever for about one week. Liver and spleen normal.
U. S. reaction — very slight.

Case No. 19.—Gosto, H. M., aged 37. Kala-azar. Spleen + + +. Albumen and casts in urine. Had dysentery in the wards and then developed lobar pneumonia.

Hb—36%,	R. B. C.	2,400,000
	W. B. C.	2,800
	P. M.	55%
	S. M.	40%
	L. M.	5%
		No malaria.

U. S. reaction + + +.
Globulin test +.

Case No. 20.—Jiban Kanai, H. M., aged 20. Kala-azar. Liver enlarged. Spleen + + +, tender; fever 1 year.

Hb—26%,	R. B. C.	1,700,000
	W. B. C.	800
	P. M.	40%
	S. M.	56%
	L. M.	4%
		No malaria.

U. S. reaction + + +.
Globulin test +.

Case No. 21.—Gopi Chand, H. M., malignant malaria. Fever 15 days. Liver enlarged; spleen + +.

Hb—40%,	R. B. C.	2,600,000
	W. B. C.	1,400
	P. M.	48%
	S. M.	48%
	L. M.	4%

Crescents found.
U. S. reaction — very slight.
Globulin test +.

Case No. 22.—Korban Shah, M. M., aged 20. Kala-azar, fever for about 1½ years. Spleen +, anæmic. Had 3 injections of urea stibamine.

Hb—30%,	R. B. C.	2,200,000
	W. B. C.	2,000
	P. M.	36%
	S. M.	60%
	L. M.	4%
		No malaria.

U. S. reaction + + +.
Globulin test +.

Case No. 23.—Sk. Korban Ali, M. M., aged 24. Pneumonia. Meningism. Hyperasthesia. Spleen normal. Lumbar puncture fluid normal.

Hb—60%,	R. B. C.	4,300,000
	W. B. C.	22,200
	P. M.	82%
	S. M.	16%
	L. M.	2%
		No malaria.

U. S. reaction absolutely negative.
The cerebro-spinal fluid gave a positive reaction + + with the urea-stibamine solution.

Case No. 24.—Romjan, M. M., aged 14. Malaria: Spleen +. Liver +, responded to quinine.

Hb—38%,	R. B. C.	2,500,000
	W. B. C.	4,200
	P. M.	50%
	S. M.	64%
	L. M.	4%
		No malaria parasite detected.

U. S. reaction — absolutely negative.
Globulin test — negative.

Case No. 25.—Pancharatan, H. M., aged 40. Lobar pneumonia. Unconscious. Cyanosed: died after admission: U. S. reaction — absolutely negative.

Case No. 26.—Narayan, H. M., aged 30. Typhoid fever, was delirious; died after admission. Spleen and liver normal.

Hb—58%,	R. B. C.	3,800,000
	W. B. C.	2,600
	P. M.	55%
	S. M.	41%
	L. M.	4%
		No malaria.

Widal + 1 in 100.
U. S. reaction absolutely negative.

Case No. 27.—Purna, H. M., aged 20. Enlarged spleen + + +. Liver +; took 26 injections of urea stibamine last year: low irregular fever for over six months: had a short attack about a month and a half ago: feels quite strong and healthy.

Hb—60%,	R. B. C.	3,900,000
	W. B. C.	4,200
	P. M.	54%
	S. M.	42%
	L. M.	4%
		No malaria.

U. S. reaction absolutely negative.
Globulin test — doubtful.

Case No. 28.—Dharma, H. M., aged 22. Kala-azar. Fever 6 months. Spleen + +, anæmic. Œdema of lower limbs and face.

Hb—50%,	R. B. C.	3,300,000
	W. B. C.	5,000
	P. M.	58%
	S. M.	38%
	L. M.	4%
		No malaria.

U. S. reaction + +.
Globulin test +.

Case No. 29.—Kishori, H. M., aged 8. Fever 2 years; anæmic emaciated; spleen + + +, kala-azar.

Hb—20%,	R. B. C.	1,300,000
	W. B. C.	800
	P. M.	38%
	S. M.	58%
	L. M.	4%
		No malaria.

U. S. reaction + + +.
Globulin test +.

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Case No. 30.—Sadat Mondol, M. M., aged 20. Kala-azar, 5 months. Spleen + + +. Liver +; anæmic.

Hb—38%,	R. B. C.	2,400,000
	W. B. C.	1,800
	P. M.	48%
	S. M.	48%
	L. M.	4%

No malaria.

U. S. reaction + + +.
Globulin test +.

Case No. 31.—Babunandan, H. M. Kala-azar. Fever 9 months. Ascites; after tapping, spleen and liver not enlarged.

Hb—30%,	R. B. C.	1,900,000
	W. B. C.	1,200
	P. M.	44%
	S. M.	50%
	L. M.	2%
	Eosino	4%

U. S. reaction + + +.
Globulin test +.

Case No. 32.—Kali, H. M., aged 15. Kala-azar. Fever for a year. Spleen + + +.

Hb—18%,	R. B. C.	1,400,000
	W. B. C.	800
	P. M.	46%
	S. M.	50%
	L. M.	4%

Widal — reaction 1 in 20.
U. S. reaction + + +.

Case No. 33.—Hazra, H. M., aged 40. Kala-azar. Spleen + + + +. Liver +, 2 years fever; anæmic.

Hb—26%,	R. B. C.	2,600,000
	W. B. C.	4,600
	P. M.	56%
	S. M.	40%
	L. M.	4%

No malaria.

U. S. reaction + + +.
Globulin test +.

Case No. 34.—Tilak Bahadur, H. M., aged 20. Spleen not enlarged at all. Fever with rigor off and on. Harsh breathing and crepitation at left apex. He responded to quinine apparently but I was doubtful.

Hb—46%,	R. B. C.	3,200,000
	W. B. C.	11,600
	P. M.	74%
	S. M.	22%
	L. M.	4%

No malaria.

U. S. reaction + +.
Globulin test +.

Case No. 35.—Kartick Chandra, H. M., aged 55. Hæmoptysis. History of diarrhœa. Tubercular focus in right apex. Spleen not enlarged.

Hb—50%,	R. B. C.	3,400,000
	W. B. C.	4,800
	P. M.	53%
	S. M.	42%
	L. M.	3%
	Eosino	2%

U. S. reaction + + + (twice examined.)
Globulin test +.

Case No. 36.—Barendra, I. Ch., male, aged 12, 7 days fever with rigor; spleen +; liver normal. Yielded to quinine; malaria.

Hb—50%,	R. B. C.	3,700,000
	W. B. C.	3,800
	P. M.	52%
	S. M.	44%
	L. M.	4%

No malaria parasite found.

U. S. reaction — absolutely negative.
Globulin test — not done.

Case No. 37.—Kalipada Das, H. M., aged 35, 7 days fever. Spleen and liver normal; gurgling of intestines.

Hb—50%,	R. B. C.	3,700,000
	W. B. C.	11,800
	P. M.	78%
	S. M.	20%
	L. M.	2%

Widal negative 1 in 20.
No malaria parasite found.

Case No. 38.—Sanatani, H. F., aged 25. Fever 6 months; took 15 injections of urea stibamine, seldom gets any fever now. Ascites; spleen + +.

Hb—42%,	R. B. C.	2,900,000
	W. B. C.	3,400
	P. M.	50%
	S. M.	46%
	L. M.	4%

Globulin — not done.
U. S. reaction + +.

Case No. 39.—Golapi, H. F., aged 30. Kala-azar, fever 6 months. Spleen + + + + weak.

Hb—40%,	R. B. C.	2,600,000
	W. B. C.	800
	P. M.	40%
	S. M.	56%
	L. M.	4%

U. S. reaction + + +.
Globulin test +.

Case No. 40.—Thakomoni, H. F., aged 32. Kala-azar, ascites; spleen + + +; bronchitis.

Hb—38%,	R. B. C.	2,700,000
	W. B. C.	5,000
	P. M.	76%
	S. M.	20%
	L. M.	4%

No malaria. U. S. reaction + + +.
Globulin test + (Partial).

Case No. 41.—Nasar Mondol, M. M., aged 40. Kala-azar: duration of fever 1½ years. Spleen + +; Liver + +.

Hb—40%,	R. B. C.	2,900,000
	W. B. C.	2,000
	P. M.	48%
	S. M.	48%
	L. M.	4%

U. S. reaction + + +.

Case No. 42.—Rampal Singh, H. M., aged 35. Gives history of fever for only 8 days during this present attack: spleen + +, very weak. Unable to walk about. Complained of headache. Fever came down after 10 days. (Kala-azar).

Hb—54%,	R. B. C.	3,900,000
	W. B. C.	1,400
	P. M.	48%
	S. M.	48%
	L. M.	4%

No malaria. U. S. reaction + +.
(This case could not be observed as he left hospital.)

I am greatly indebted to Major E. W. O'G. Kirwan, M.B., F.R.C.S.I., Superintendent of the Campbell Hospital, for allowing me to publish these cases.

THE INCIDENCE OF HELMINTHIC INFECTIONS IN THE CARMICHAEL HOSPITAL FOR TROPICAL DISEASES, CALCUTTA.

By A. K. MUKERJI, M.B.,
Assistant Research Worker, Hookworm Research Laboratory, Calcutta School of Tropical Medicine and Hygiene.

IN a recent paper, Chatterji (1927) has described the incidence of helminthic and proto-

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zoal infections in the surgical wards of the Calcutta Medical College Hospitals during the years 1925 and 1926. It will be of interest to compare the findings during the same period in the Carmichæl Hospital, attached to the Calcutta School of Tropical Medicine, with those of its neighbour, the Medical College Hospitals.

Examination of the stools of every patient admitted in the Carmichæl Hospital is a part of the routine procedure adopted in the Bacteriological, Helminthological, and Protozoological Departments and here the helminthic infections only are considered. All stools are examined by Lane's direct centrifugal flotation method and also by McVail's thick smear and levitation process. By a combination of these two methods, it is unlikely that any infection has been overlooked. The findings are shown in the annexed table, and to facilitate comparison Chatterji's figures for the Medical College Hospitals have also been included.

TABLE.

	1925.		1926.		Total.		Medical College Hospital.	
Total No. of stools examined	665	%	859	%	1,524	%	371	%
Ova of *Ankylostoma* ..	178	26·7	245	28·5	423	27·6	43	11·6
„ „ *Ascaris lumbricoides*	78	11·7	84	9·8	162	10·7	20	5·4
„ „ *Trichuris trichiura* ..	95	14·3	108	12·6	203	13·4	11	3·0
„ „ *Tænia saginata* ..	1	0·15	7	0·8	8	0·47	2	0·5
„ „ *Hymenolepis nana* ...	1	0·15	1	0·1	2	0·12	5	1·3
„ „ *Oxyuris vermicularis*	..	...	5	0·6	5	0·3	3	0·8
„ and larvæ of *Strongyloides.*	8	1·05	13	1·5	21	1·27	7	1·9
„ of *Trichostrongylus* ..	1	0·15	5	0·6	6	0·37	..	..
„ „ *Heterodera radicicola*	..	..	2	0·2	2	0·13	..	..
„ „ *Fasciolopsis buski* ..	..	..	1	0·1	1	0·06	..	..
„ „ *Bertiella satyri* ..	1	0·15	..	..	1	0·06	..	..

REFERENCE.

Chatterji, D. M. (1927). The Incidence of Intestinal Parasites in Calcutta Hospital Population. *Indian Med. Gaz.*, 62, No. 5, p. 252.

A Mirror of Hospital Practice.

A CASE OF EXTENSIVE SCALDING.

By NOOR HUSAIN, M.B., B.S.,
Medical Officer, Kistwar, Kashmir State.

S., A FEMALE child, aged 2½ years, whilst playing in the kitchen, fell into a large basin full of boiling hot milk, on the 25th May 1927. She was instantaneously pulled out by a servant close by and I saw her two hours after the accident. She was then in a condition of acute restlessness, and the extent of the scalding was extremely severe. In front the scalded area reached from below the xiphisternum to the vulva, and involved the inner side of both thighs to the knees. On the back it extended from the 6th dorsal vertebra to the anus, with involvement of both buttocks. A part of the abdomen on the right side had escaped. The scald was of the second degree throughout.

As the patient was not in a condition of extreme shock, the scalded condition was first treated. The area of skin surrounding the injured surfaces was cleansed with soap and water, with the aid of a brush; and the actual scalded area was carefully cleaned up by manual application of soap and water. After drying, the whole area was dressed with gauze smeared with vaseline, blisters being carefully snipped and their contents allowed to escape. The vulva required separate dressings which had to be more frequently changed. The utmost care was taken to preserve full aseptic precautions whilst dressing the case, and bandages were applied rather lightly.

For the first three days, the patient remained in rather a collapsed state, which was combated by giving brandy, strychnine, adrenalin, and saline infusions. There was also an inflammatory fever, ranging from 99° to 103°F.

On the 9th day after the accident, the patient complained of griping abdominal pains; these were paroxysmal in character, and each paroxysm lasted about one or two minutes, with marked restlessness, a pinched facies, and rigidity of the abdominal wall. She passed three or four stools daily, semi-solid, of a greenish colour, and containing mucus. No blood was passed. She was now put on to castor oil emulsion, and bismuth-starch-opium enemata administered.

As to actual tenderness of the abdomen, it was practically impossible to elicit definite information on the point; but she cried out at every manipulation of the abdominal wall. The abdominal wall, however, was quite flaccid between the paroxysms. Finally, the 11th night after the scalding, she was in an extremely restless condition, and subsequently pulseless. She died

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the following morning at 6 a.m. on the 12th day after the injury.

The abdominal dressings were only renewed thrice during these 11 days; no suppuration occurred; and on the 10th day the raw surfaces were healing up. An autopsy was unfortunately not obtainable.

The case has puzzled me. In the first instance the initial collapse was severe, and lasted for three days. Subsequent to that, however, the patient appeared to be doing well, when, on the 9th day, the acute abdominal symptoms set in. Can any of your readers throw any light on the cause of death?

(*Note.*—The case, which is a very interesting one in its clear and detailed information, is surely one of those rare cases of death from duodenal hæmorrhage, following upon extensive burning or scalding. Carless, in the 11th edition of Rose and Carless' *Surgery* (1924), p. 132, writes, 'One of the most interesting sequelæ, though at the present day it is admittedly uncommon, is ulceration of the duodenum. The ulcer is of the usual duodenal type and occurs close to the orifice of the bile-duct. It probably results from the elimination by the liver of some irritating substance derived from the septic changes in the burnt tissues which is capable of inducing thrombosis, or of producing ulceration.'—EDITOR, *I. M. G.*)

A CASE OF BULLET WOUND OF THE ABDOMEN.

By Asst. Surgeon ABDUL SAMAD KHAN, M.B., B.S.,
Egerton Hospital, Peshawar City.

NIKMAL, Hindu male, aged about 18 years, was admitted to the Egerton Hospital, Peshawar, at 3 a.m. on the 25th May 1927, with an abdominal bullet wound. The point of entry was the size of a two-anna bit, and situated in the left 10th intercostal space in the infrascapular line. The exit wound—very similar in appearance— was just below the left costal arch in the anterior axillary line. The injuries had been received about 10 p.m.

The patient on admission complained of abdominal pain, and had slight vomiting, but with no blood; the abdomen was slightly distended and tender on pressure on the left side; pulse, 120 per minute. He could not pass any flatus.

Immediate laparotomy was carried out, the abdomen being opened by a left para-rectal incision. It was found to be full of blood, and on mopping this out, it was found that the stomach had been perforated through and through at the fundus and was incidentally quite empty, whilst the bullet had grazed the spleen. The opening in the stomach was closed by a double row of purse-string sutures on both anterior and posterior surfaces; the abdomen was closed and drainage effected through a separate incision in the left flank. The original entry and exit wounds were trimmed and sutured. The patient was put to bed and kept in Fowler's position from the very beginning.

For the first two days the patient had a tender abdomen, but with free drainage, and for the first seven days progress was normal. The only diet allowed was feeds of sodium bicarbonate, glucose water, fruit juices, tea, etc.

On the eighth day after operation, sudden colicky pains set in, with vomiting and stoppage of flatus. Repeated high turpentine enemata were given, combined with local turpentine stupes, but without effect. His condition got worse and definite signs of intestinal obstruction set in, with a rapid, feeble pulse, and vomiting, which finally became of a fæcal character.

The abdomen was therefore again opened on the 2nd June, in the mid line. The small intestine was found kinked at two places; firstly through adhesions contracted to the site of the original operation wound, where the peritoneal catgut stitches had probably given way and exposed a raw surface; and secondly, by adhesions between the coils of the small intestine, due to slight plastic peritonitis. The adhesions were broken down and the gut systematically examined and reduced.

The abdomen was then closed. The patient had a tentative movement of the bowels two hours after operation, and made an uneventful recovery, being discharged cured on the 15th June 1927.

The interesting features of the case are the following:—

(1) The uneventful recovery of the patient for the first 8 days, due to timely operative measures available within 12 hours of being wounded.

(2) The importance of drainage in all such injuries of the gut, combined with Fowler's position immediately after the operation is finished.

(3) The formation of adhesions and sudden kinking of the gut with symptoms of intestinal obstruction; a possibility which should always be borne in mind in such cases.

THE DIAGNOSIS OF GANGRENE OF THE SMALL INTESTINE AND PARTIAL INTESTINAL OBSTRUCTION.

By Dr. P. V. GHARPURE, M.D.,
Grant Medical College, Bombay.

THE very interesting account and discussion published in the *British Medical Journal* of May 7th, p. 863, and June 4th, pp. 1033 and 1034 prompts me to send to you for publication the following account of two cases I have so far come across during the last five years.

Case No. 1.—A well built male patient aged 35 years was admitted in the Sir J. J. Hospital, Bombay in the wards of the Senior Physician, under whom I had charge of the wards, on the 1st January 1922 for severe and unbearable pain in the epigastric region for five days before admission. The pain was gradually getting worse. Careful examination revealed that the abdomen was soft and there was no resistance to palpation anywhere. An enema resulted in partial

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elimination of the water; the suspected history of syphilis, helped by a blood examination, in the absence of any leading signs and symptoms tempted the diagnosis of "tabetic crisis," and on this strength I gave a hope of longer life to the poor man's relatives. On the 2nd, January in the evening at 5 p.m. I suddenly noticed that the pain was worse; the abdomen got distended and he started vomiting with well marked resistance which made me think of commencing peritonitis. I do not recollect whether he was passing flatus. An exploratory laparatomy was decided on and done, and on the operation table there was found thrombosis of the superior mesenteric artery, and gangrene of the small intestine. The patient died on the 3rd January in the morning. (*Post-mortem* could not be obtained.)

The point that I noticed about this case was the pain, in the absence of any definite signs, and a persistent slow pulse varying between 50 and 60 per minute as recorded by repeated observations till the complicating symtoms just before operation, when the rate was faster.

Case 2.—The second case was a stout male farmer, aged 35, coming from up-country on 25th February 1926, while I was working as Honorary Physician, Out-Patients Department, Sir J. J. Hospital. His history was as follows:—

"Pain in the abdomen of 15 days duration, more after food, no vomiting, no constipation, distension of the abdomen."

Examination revealed but slight resistance to palpation in the umbilical region, and a slow pulse. The general impression created at that time made me think on the mere strength of the marked slow pulse rate and the severe persistent pain, in the absence of physical signs, of a diagnosis of "thrombosis of the superior mesenteric vein or artery," and I sent the case immediately for urgent operation. The patient was prepared for this and an exploratory laparatomy done, and the surgeon did not find any lesions in the abdominal vessels or organs. The abdomen was closed. The patient died the same night and I had the good fortune to obtain an autopsy on the body. The *post-mortem* revealed extensive gangrene of the whole of the small intestine, a firm thrombosis in the superior mesenteric vein extending right up to vena portæ and its branches in the liver, causing a large infarct of the size of 6 in. × 4 in. in the liver.

(*Reference: Path. Depart. Post-Mortem Records*, Vol. XXII, page 874, dated 26th February 1926.)

These cases suggest that a slow pulse in the presence of the combination of the symptoms referred to by writers in the *British Medical Journal* of May and June may be of importance in deciding on a diagnosis of thrombosis of the superior mesenteric vein or artery.

ATROPINE SULPHATE IN STRANGULATED HERNIA.

By Capt. N. N. GHOSH, M.B.,
Narayanganj.

IN medical practice atropine sulphate is relied upon to relieve the acute pain caused by spasmodic contractions of involuntary muscle, such as occur in renal and intestinal colic. The acute pain of strangulated hernia is also due—in the majority of cases—to spasm of involuntary muscle of the strangulated coils of intestine. If the spasm is relieved, reduction of the hernia may be much easier.

With this idea in view, I began to administer atropine sulphate in doses of 1|50th grain in such cases, and have succeeded in effecting reduction of the hernia in cases where the application of ice and subsequent gentle traxis failed.

The following is such a recent case: Mr. —, aged 50 years, had been the subject of scrotal hernia for years. On the 26th June 1927 strangulation of the hernia suddenly set in in the afternoon. A local doctor, who was called in, applied ice and tried to reduce the hernia without success. I was called in after dark and found the patient in great agony and very restless. The swelling was about the size of football, elongated and very tender. I advised an injection of gr. 1|50th of atropine and to continue the application of ice, and to send the patient immediately to the Mitford Hospital at Dacca for operation. This was done. Luckily, the strangulation was relieved and the hernia reduced whilst the patient was still on his way to Dacca, and he returned without any necessity for having to undergo operation.

Injection of atropine should be given a trial in all such cases, as long as the spasmodic state persists. Of course, once the paralytic state has set in, it would be useless. I would be glad if other readers of your journal would give an account of their experience with the method.

LUMINAL-SODIUM IN THE TREATMENT OF TETANUS.

By GIANCHAND BLAGGANA, M.P.L.,
I/c Sadar Bazaar Male Dispensary, Delhi.

THE cost of anti-tetanic serum in this country is so high that it is but rarely available for the treatment of cases. We have consequently to fall back upon other lines of treatment; and in this connection I have found hypodermic injections of "luminal-sodium" of great value during the past three years. In fact, it is so useful that I now very rarely use the anti-serum. The following are illustrative cases.

Case 1.—Shauqat, aged 3½ years, Mahomedan girl. Admitted on the 18th October 1925 with lock-jaw and stiffness of the neck of one week's duration. Quite unable to take nourishment. A recently healed wound present on the right occipital protuberance.

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She was at once given 1 c.c. of the luminal-sodium solution hypodermically, followed by daily doses of 2 c.c. of the same solution.

On the 20th, she was able to open her mouth; on the 31st the injections were stopped; and on the 8th November she was discharged cured.

Case 2.—Siraj-ud-din, Mahomedan, male, aged 13 years. Admitted on the 4th February 1926 with tetanus of six days' duration. Cannot open his mouth, with stiffness and pain all over the body. Rhonchi and crepitations over the bases of both lungs. Emaciated and not taking his nourishment well. There is an unhealthy chronic ulcer on the left leg. Given at once 3 c.c. of the luminal-sodium solution, stimulant expectorant mixture, and plenty of hot water to drink.

The next day he could open his mouth a little, and the convulsions had ceased; but they recurred with some severity on the 6th. On the 7th he was given 2 c.c. of the luminal-sodium solution with 10 mm. of liquor adrenalin chloride added to it. This was repeated daily. On the 12th there was abdominal distension and diarrhœa, and on the 13th and 14th a tendency to suppression of urine. By the 19th, the patient could open his mouth well and speak well. On the 25th cellulitis developed in the right arm at the site of the injections. The injections, however, were continued; and he was discharged cured on the 8th March.

The formula used is as follows:—

℞. Luminal-sodium gr. xxx.
Aqua distill. steril. 10 c.c.

Solve et filtra. Signa. For injection. Dose; 1 to 3 c.c. hypodermically. (The water used for dissolving the powder should be boiled for half an hour, and cooled down to 85°F. The solution should be kept in a well-stoppered bottle, and used before it is a week old.)

NOTES ON TWO CASES OF UNDIAGNOSED FEVER.

By LOUIS H. L. MACKENZIE,
MAJOR, I.M.S.,
Civil Surgeon, Hazara.

Case 1.—The patient, aged 4½ years, was the son of a British officer.

He was stated to have had fever about midday on the 26th May and this was at the time attributed to a large quantity of cherries which he had eaten in the morning. He was also said to have been somewhat snuffly for a few days, but in general he appeared to be in his normal good health. I saw him on 27th May.

27th May.—Well-marked petechial rash, especially on forearms and legs. Very little on chest and practically none on face. Small tender gland behind right mastoid. Vomited once.

28th May.—Rash very pronounced, especially on forearms. More on face, but slight on chest and abdomen. Tongue with white fur. Pains in limbs. He moves them fairly freely but complains when he is touched or moved. No swelling of joints. Constipated. Possibly some delirium last night. Vomited again.

29th May.—Rash very marked and consisting of the original spots much increased in number and also dark red blotches. Bowels loose—probably due to medicine given the night before. Pains all over. Some cough and redness of the fauces.

30th May.—The dark blotches are disappearing and the child presents a typical measles appearance with more rash on the face, forehead and neck. For a day or two he has complained of photophobia and the eyes are injected and watery.

31st May.—The condition remains the same.

1st June.—Fresh crop of rash, but eyes and general condition better.

2nd June.—Very much better. The rash from now on began to fade rapidly and during the period of fading there was a distinct "branny desquamation." Brown stain spots were visible on the 4th of July. Koplik's spots were not seen at any time. The spleen was not palpable. The mastoid gland could not be felt after a few days. Headache was not complained of. Eye trouble, drowsiness and fretfulness were most marked during the middle part of the fever. Convalescence was very rapid.

Case 2.—This patient was a British officer, aged 32½ years, and the father of the previous patient.

He was stated to have had an evening temperature on the 6th of June of 102°F. On the following morning his temperature was normal but he was said to have had "spots" on his forehead. They were not visible at midday.

8th June.—A few spots on forearms and chest. No Koplik's spots. Tongue with white fur. Some cough. Pain in eyes. Headache. Spleen not palpable.

10th June.—Rash increased during last two days, and now marked on forehead. Headache persists.

12th June.—Cascara last night and magnesium sulphate this morning. Headache relieved and tongue cleaner. Rash beginning to fade. Feels and looks better.

No Koplik's spots seen at any time. No enlargement of the spleen. Pain in the limbs complained of. The patient is said to have had paratyphoid, chicken-pox, and measles (twice).

I had to leave Gilgit on the 14th June and the patient was then left in charge of the Assistant Surgeon.

16th June.—More spots on back.

18th June.—Enlarged gland behind left ear,—about size of a pea.

20th June.—Spots fading. Gland disappeared.

The stains of the rash were still visible on the 4th July. The blood was examined but no parasites of any kind found.

I have been unable to arrive at a satisfactory diagnosis of these two cases.

Cases of chicken-pox had occurred shortly before and when I was first called to see the

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small boy I was prepared to find his illness due to that. Chicken-pox however was soon ruled out.

So was measles of which, so far as I could discover, no other cases existed in the neighbourhood.

Typhus appeared to be the most likely diagnosis, though the symptoms and their course were not typical.

I had a case of what I considered to be typical typhus in a British officer in the same bungalow about a year previously, and there were some interesting sequels to the above narrated cases.

1. A few weeks after I had sent these notes to the Superintending Surgeon I met him in Kashmir. He told me that on reading my cases he came to the conclusion that they were exactly similar to two which he had himself recently seen.

2. In September I was back in the Gilgit Agency and on tour in Hunza, about 60 miles from Gilgit, the compounder, an intelligent Indian with 30 years' experience, described to me an outbreak of a small epidemic which he had thought to be typhoid. In all there were about 15 cases, of which 8 were fatal. The disease spread very definitely up stream; it originated in a house to which a week or so before there had returned a man who immediately previous to his return had lived in the compound of the officer who was No. 2 case; and questions as regards the signs and symptoms of the disease left no doubt in my mind that it was the same as that which I have described.

The mortality was surprising in view of my small experience, but hygiene and nursing were undoubtedly nil and treatment, if any, very sketchy. I am quite certain that these cases were perfectly distinct from ordinary typhus. There was no history of tick-bite in either case.

A CASE OF INTESTINAL OBSTRUCTION.

By M. UMAR,
Officiating Civil Surgeon, Bijnor, U. P.

BUDHA, Hindu male, aged 60, was admitted to hospital suffering from severe and diffused abdominal pain, with a drawn and pale facies, and a subnormal temperature. There was no passage of either fæces or flatus, and bilious—but not stercoraceous—vomiting was present. The abdomen was extremely distended; the pulse weak, rapid and thready.

He was given three consecutive enemata, with no result. At the suggestion of one of my assistants a high enema with a big tube was given, but also without result.

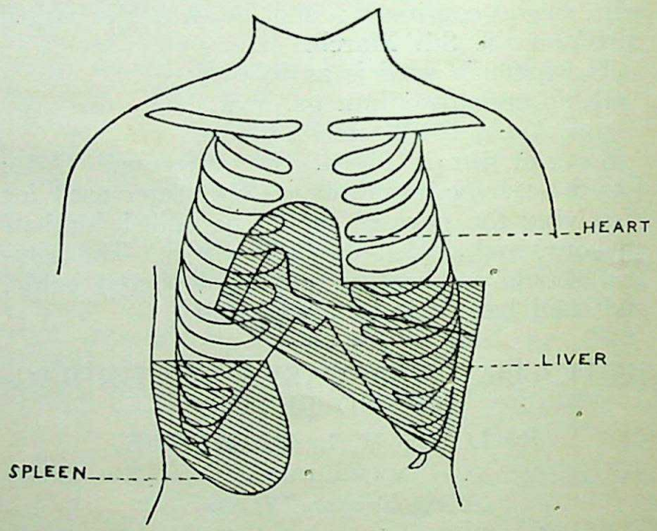
Operation.—As surgical measures appeared to be the only possible line of treatment, he was anæsthetised and the abdomen opened by an incision from 2″ above the umbilicus to 1″ above the symphyisis pubis in the middle line. The great omentum was found to be adherent in four places to coils of gut, and this had apparently produced the obstruction. In removing these adhesions, the gut was perforated slightly in two places and had to be sutured with purse-string sutures. The abdomen was full of a reddish fluid, and apparently peritonitis had set in. After thorough cleansing of the abdomen, the intestines were replaced and the abdomen closed in the usual fashion.

After operation the patient was allowed nothing at all except ice to suck for three days. Flatus was passed in large volumes and the abdominal distension disappeared. On the second day after operation a small, watery stool was passed. A day and night attendant was placed in charge of the case, and the patient made an uneventful recovery. The cause of the obstruction appeared to be plastic peritonitis with adhesion of the great omentum to the gut.

A CASE OF TRANSPOSED VISCERA.

By M. S. PAL, L.M.P.,
Medical Officer, Deamoolie Tea Estate, P. O. Doom Dooma, Assam.

GOKUL, a young male tea coolie on this estate, was admitted to hospital with malaria. On examination his spleen was impalpable, but there was a hard mass about two inches in width projecting below the costal region in the right hypochondrium, which was suspected to be an



enlarged liver. The patient gave a history of dysentery some months previously, but was not passing blood or mucus at the time of admission. He was treated, however, with quinine and emetine. The fever subsided the next day, but the supposed hepatic enlargement remained. After six injections of emetine, gr. 1 each, the enlargement on the right side remained, and the patient was examined by Dr. Moncrieff Joly, my Principal Medical Officer. He discovered that a distinct splenic notch could be felt in the mass on the right side; the heart was also lying to the right side; and the larger lobe of the liver to the left. The conditions present are illustrated in the diagram.

I am much indebted to Dr. Joly for permission to publish the notes on this case.

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Indian Medical Gazette.

DECEMBER.

THE MOFUSSIL DISPENSARY.

IN our issue for January 1927, we published a "special article" by Lieut.-Col. A. H. Proctor, I.M.S., on "The Dispensary Treatment of Malaria in India"—an article which we especially included in that number by way of contrast to the account contained in the same number of Sir Ronald Ross' historical and pioneer work in India on the transmission of malaria. We hoped that from this our readers would draw the lesson that discovery is but one element in public health control, and that a wide gap may yawn between discovery and the practical application of its results.

In his article Colonel Proctor had certain criticisms to make of the *mofussil* dispensaries scattered all over India; and his remarks must have roused a sympathetic echo in the breasts of the many civil surgeons all over India who have such dispensaries under their control. It was not so much criticism of the men in charge of these dispensaries, as of the inadequacy of the dispensaries that Colonel Proctor put forward. The *mofussil* dispensary in India is the pioneer outpost of modern scientific medicine in the wilds, but it is usually deplorably under-equipped, under-staffed, and under-valued.

As we expected, Colonel Proctor's remarks have not passed without challenge, and we have received—some months ago, we regret to say—a long letter from Sub-Assistant Surgeon Amullya Kumar Bhattacharya, L.M.P., in charge of the Dalgram Charitable Dispensary, Rangpur, Bengal, contesting Colonel Proctor's evidence. We have hesitated for some time whether to deal with this matter in our editorial or in our correspondence columns, but consider that the time has now come to bring forward the very important questions at issue. The burden of Dr. Bhattacharya's complaint is that it is not the men in charge of these outlying dispensaries who are to blame, but the system by which they are starved of funds, staff, and reasonable equipment. His letter is too long to reproduce verbatim, but we take the following extracts from it.

"Colonel Proctor has made the Indian medical practitioner of the sub-assistant surgeon class especially responsible for the failure of the Indian masses to accept modern medical treatment. He writes 'The sub-assistant surgeon was originally intended to work under supervision. His very title implies that. At present he is being put in independent charge of such dispensaries,' and, 'The scattering of these under-trained medical practitioners over the country is, I believe, undermining what little faith the masses have in modern medicine, and paving the way for the revival of the indigenous systems.'.....Who is responsible for this under-training? Is it not reasonable to ask that when a sub-assistant surgeon is qualified, his qualification should be of a high enough standard to enable him to grapple with his duties? In spite of the stigma which it is sought to attach to the status of the sub-assistant surgeon, the majority of these officers are doing excellent work when placed in independent charge of rural and even of sadr dispensaries. The uneducated masses in India have still a very strong faith in the causation of disease by the influence of evil spirits (*ojhas*), and still worship such spirits and offer sacrifices to them for the cure of disease. The illiteracy of the masses, rather than the incapacity of the doctors concerned, is the chief obstacle in the way of the progress of modern scientific medicine.

"Further, a man is only able to show his efficiency when he is provided with full facilities. Until recently a sub-assistant surgeon was regarded as a subordinate by both the commissioned officers of the medical services, and by the assistant surgeons over him; he was not even allowed to perform any important surgical operation independently, nor encouraged to use a microscope. Experience can only be gained by practice, and it is precisely experience which was denied to the sub-assistant surgeon.

"Still more, a sub-assistant surgeon placed in charge of an outlying dispensary is handicapped in every way. He is given a salary of Rs. 30 to Rs. 40 a month—or less than what is earned by an ordinary *raj mistri**; for a year's work he is given a stock of drugs costing from Rs. 200 to Rs. 500, according to the class of dispensary concerned, without any attention being paid to the attendance at his dispensary or its real requirements. The surgical instruments provided are just sufficient for ordinary minor surgery, but inadequate for anything else; arrangements for sterilisers, etc., are conspicuous by their absence; whilst his staff consists of a compounder—who is generally untrained, and with no knowledge of asepsis, on a pay of Rs. 15 to Rs. 20 p.m.; and a servant at Rs. 7 or Rs. 8 p.m. Some of the more fortunate dispensaries are provided with sweepers, but not all. The patients concerned are illiterate; they are fully convinced of the virtue of *mantras* and *ojhas*; they expect a final cure of any disease, however severe, within 48 hours. Thus a patient who is suffering from kala-azar is informed that three months' treatment will be necessary before he is completely cured, but one rarely sees him after the second injection of antimony, as he believes that the improvement already noticed indicates cure. Further, sera and vaccines—which form so important a part of modern therapy—are not available in the *mofussil* dispensary; and tetanus has to be treated by injections of magnesium sulphate or carbolic acid, and diphtheria on symptomatic lines.

"To turn to diagnosis, very rarely indeed is a District Board dispensary—and far less a municipal dispensary—provided with a microscope. The medical practitioner in Calcutta can refer his patients to this, that, or the other laboratory for skilled microscopic examination. In the *mofussil* the doctor has to be content with a clinical diagnosis on symptoms and signs, and he will in the first place treat most cases of "fever" with quinine, unless the clinical diagnosis is all against malaria. Colonel Proctor writes 'Surely we can so organise our medical relief that each case of malaria shall receive 90 grains of quinine in solution when he visits a dispensary. It is not reasonable to expect a malaria patient to walk several miles daily to obtain 15 grains of quinine.' But he is not aware of the fact that an illiterate villager, on taking 30 grains of quinine in 24 hours, usually suffers from cinchonism, and throws away the rest of

* For the benefit of our overseas readers, we may state that a *raj mistri* is a head carpenter or head workman.

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the medicine supplied to him. Further with regard to stocking of *mofussil* dispensaries with cinchona febrifuge, patients show great reluctance to take the "red" cinchona febrifuge mixture, and clamour for the "water-coloured" quinine solution. There is no chance to treat these patients effectually, for very few of them turn up for a second day's dose of medicine.

"Malaria, kala-azar, influenza, rheumatism and gastro-enteric troubles are the commonest troubles treated in the charitable dispensaries in Northern Bengal. Every member of the medical profession will recognise that the full diagnosis of these disorders demands full laboratory facilities, and their adequate treatment is often a prolonged affair. The treatment afforded in the ordinary *mofussil* dispensary cannot be more than a matter of a few days or a few doses of medicine. The dispensary records show that the average number of days attended by a patient is, at the most, two; whilst some fifty per cent. of patients do not even attend in person, but send a relative for a dose of medicine. Taking one thing with another, it is not justifiable to state that "the scattering of these under-trained medical practitioners over the country is.....paving the way for the revival of the indigenous systems of medicine."

"Turning to the surgical side of practice in *mofussil* dispensaries, some 75 per cent. of such patients are admitted in an absolutely "rotten" condition—sometimes even in a moribund state. In spite of this, as far as I am aware, it is the surgical work in the *mofussil* dispensaries which has led most to their popularity with the people. Yet the difficulties are enormous; an insufficient and untrained staff, a wholly inadequate stock of surgical instruments, the utter want of proper facilities for sterilising and for aseptic surgery, and finally the complete want of anything in the way of skilled nursing. Even accommodation for such cases is often severely restricted. In spite of all this, cases of scrotal tumour, hydrocele, hernia, vesical calculus, liver abscess, ovarian cyst, perforating wounds of the abdomen, etc., are daily successfully dealt with in the *mofussil* dispensaries of India.

"To turn, yet again, to obstetric practice in the *mofussil*, nephritis in pregnant women is a common complaint, and, if untreated, is apt to prove very fatal. But the popular belief is that this is due to possession by a ghost—the *bhuter dristi*. The maternal mortality due to septic attendance on cases by relatives and untrained women is simply shocking. The septic and untrained country *dai*, and *mantras* and *pujas*, make up the usual scheme of attendance, and the results are too horrible to contemplate. On one occasion I was called in to a case of transverse presentation where the *dai* had applied such forcible traction that the child's arm had been pulled away at the shoulder joint; both mother and child were dead before I arrived. Can such a state of things be paralleled in any other country in the world?

"In conclusion, and in reply to Colonel Proctor's article, one would like to stress that what we press for is not condemnation, but reform. The present conditions being what they are, one would like to make the following suggestions for improvement:

(1) The idea that insufficient treatment is better than no treatment at all in the *mofussil* dispensaries should be abandoned. In the case of class IV and V dispensaries the local committee should be made to execute a bond certifying that the funds available are sufficient and that the sources of income are sound and reliable. The civil surgeon should pay particular attention to this matter on his visits of inspection. If this is not the case, the dispensary should be closed.

(2) Every dispensary should be a *pucca* brick building, with separate sections for aseptic surgical work, septic cases, and microscopical work. It is amazing to think that aseptic surgical technique should be demanded in dispensary buildings which consist of bamboo matting with one or more sides open to every wind that blows.

(3) At least four beds should be provided in every dispensary. This is the minimum requirement for emergency and serious cases; even in the most remote village. Nursing to be carried out—if at all—by the relatives.

(4) Every dispensary should be in charge of a medical man of at least five years' experience. A fully qualified compounder, a trained dresser, a trained midwife, and a sweeper should form the remaining part of the establishment.

(5) The pay of the officer in charge and of the establishment should be such as to keep them free of pecuniary anxiety. The following grades may be suggested:

Officer in charge. Rs. 100 to Rs. 200 p.m.
Compounder. Rs. 25 to Rs. 40 p.m.
Dresser. Rs. 15 to Rs. 25 p.m.
Servant. Rs. 12 to Rs. 15 p.m.
Sweeper. Rs. 8 to Rs. 10 p.m.

(6) Each dispensary should hold a sufficient stock of medicines and surgical appliances for the work which it is normally called upon to carry out. Such sera and vaccines as are ordinarily used or needed should be held in stock—if necessary for issue to patients at cost price on payment.

(7) Every dispensary should be provided with a microscope and the few essential stains and reagents for ordinary work.

(8) The dispensary should ordinarily remain open to the public for four hours in the morning; and the officer in charge should be free during the afternoon for microscope work, writing up cases, surgical work, and special duties.

(9) The custom of giving medicines to patient's relatives should be stopped, and everyone requiring treatment should be made to present himself at the dispensary in person.

(10) The Public Health Department should provide the dispensary with a reasonable amount of prophylactic anti-cholera and other vaccines in order to meet the outbreak of epidemic disease as soon as it occurs.

(11) The managing committee of the dispensary should be really representative and efficient, and the medical officer concerned should be *ex-officio* a member of the committee. (At present he is not so; *vide* rule 20 of the *Bengal Dispensary Manual*.)

"Finally," writes Dr. Bhattacharya, "every medical student preparing for the L. M. F. examination should be given full training in ordinary microscope work, and also special training in tropical diseases; since he will in the future be called upon often as the sole member of the medical profession available to attend the sick and suffering in rural areas."

. . . . .

We have tried to give the gist of Dr. Bhattacharya's letter, as far as possible in his own words. We submitted his letter to Colonel Proctor, who writes as follows:

"I agree with him in nearly everything he says about *mofussil* dispensaries. As a matter of fact my article was really a plea for the abolition of the inferior qualification of sub-assistant surgeon, with all its implications of inferiority which it carries. It was meant as a protest against the establishment of medical schools at district headquarters hospitals. Only one result can follow; namely that the status of the sub-assistant surgeon will sink still lower and lower, and his pay will follow the same course. Already compounders—some of them not qualified—are obtaining posts on tea gardens as "doctor babus" in competition with trained sub-assistant surgeons.

"The recruits for the Campbell Medical School have just as good educational qualifications as those at the

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Medical College Hospital. Why should we not endeavour to train them to University standards? In any case, my article was a criticism, not of the individual, but of the system, and your correspondent has torn my statements out of their context. I was in no way blaming the sub-assistant surgeon for his poor training, and I readily admit that some of them are doing most excellent work under very adverse conditions. The pity is that men of that stamp should have been deprived (through no fault of their own) of making full use of their abilities.

"You ask for a solution of the problem of the *mofussil* dispensaries. My own ideas are (*a*) Government to take over and staff an efficient and up-to-date district headquarters hospital. Neither District Boards nor Municipalities nor voluntary organisations can maintain one. It should be complete, with surgeons, physicians, sisters, and nurses. The *mofussil* dispensaries should be either adequately staffed with an efficient medical officer in charge who has held the post of either house physician or house surgeon, with proper remuneration and staff and adequate finances for drugs, surgical equipment, etc.; comfortable quarters and suitable dispensary buildings: or, where these cannot be provided the dispensaries should be abolished, and suitable local medical practitioners subsidised to practise in these areas."

. . . . .

The correspondence which we have quoted raises one of the most fundamental questions in the whole of medical policy in India. To come down to bed-rock fact, what is it that this country—or rather subcontinent—requires in the way of medical attendance for the masses; quality or quantity? For ourselves, we would unhesitatingly vote in favour of quality, rather than quantity. "A little leaven leaveneth the whole" is not merely a biblical quotation; it is sound common sense. And if district headquarters hospitals are to be elevated to the status of teaching medical schools, as is now the case in certain districts in Bengal, then their staff and equipment must be made thoroughly up-to-date and efficient.

With regard to the *mofussil* dispensary matters are different. These dispensaries are—so to speak—the front line trenches, or perhaps rather the first-aid stations and casualty clearing stations, in the war against disease. If so, there are two alternative policies; either to regard them as positions to be lightly held, or as vantage grounds which can be permeated and thrust forward by reinforcements from behind. The money available does not appear to be adequate to staff and equip these dispensaries in a proper manner, but the fact remains that they have rendered immeasurable service for many decades. It would appear to be better to regard them as first-aid posts, rather than as clearing hospitals.

Within the last few years the Indian villages and countryside have lost the splendid isolation which once was theirs. The motor bus now penetrates wherever roads—more or less passable—and bridges—more or less flimsy—will permit it. One can travel from Calcutta to Bombay by motor bus, although the journey would admittedly be an uncomfortable one. And where motor transport is available for the healthy, it can also be made available for the sick. A policy by which the isolated *mofussil* dispensaries were linked up by motor ambulance transport to large, well staffed, and well equipped district headquarters hospitals seems not impossible.

The alternative—of subsidising medical practitioners to practise in the countryside—has now been on trial for some years in the Madras Presidency, and it would be of interest to learn what have been the results. Decentralisation in matters of public health has meant that the different provinces have approached this problem in different ways. Whatever the future, the newly introduced factor of mobile transport is one which must tell in the long run.

R. K.

Current Topics.

Medical Education in India.

Report by SIR NORMAN WALKER.

(*British Med. Journ.*, 20th Aug., 1927, p. 312.)

DURING the early part of the present year Sir Norman Walker visited the medical colleges and associated hospitals of several Indian universities, and in a report to the Secretary of State for India, which is printed in the minutes of the Executive Committee of the General Medical Council, he summarizes his observations.

Until quite recently medical education in India was directed and controlled by the Indian Medical Service. "That it is as good as it is," says Sir Norman Walker, "and in many respects it is excellent, is almost entirely due to the zeal, energy, and versatility of that Service." With the Indian Medical Service the various colleges grew up in close relationship, all the professors were presidency medical officers, and at first and for many years all of them were Europeans. So long as the Government was solely responsible for staffing the colleges almost all the candidates were holders of British qualifications, inasmuch as entrance to the Indian Medical Service, from which the staffs were drawn, could be gained only by passing an examination in London. But medical administration, including provision for medical education, has now become a provincial subject in India, and the change has been followed in the colleges everywhere by a great diminution in the number of European teachers. Methods of providing teachers other than through the Indian Medical Service have been called for, and the men whose teaching experience has been small and whose training as teachers has been brief have been appointed to professorships. Sir Norman Walker thinks it would be well if young men of promise, after a couple of years' service in a scientific department of an Indian university, were sent abroad to carry their studies further under different conditions before being appointed to chairs.

With regard to examinations, he points out that there is no pre-registration examination in India; and also that all age limitations for the matriculation examination have been removed, so that not a few candidates pass at the age of fourteen, and after two years spent in studying for the intermediate arts or science examination, find it possible to commence the study of medicine proper at 16, which is one year earlier than in Great Britain. The level of secondary education in India is admittedly lower than in Great Britain, and no British university accepts the matriculation examination of an Indian university as equivalent to its own. After pointing out that it is easier to work hard for nine months out of twelve in Great Britain than in India, Sir Norman Walker suggests, as to the medical curriculum proper, that it would be well if all

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the Indian universities followed the lead of Calcutta in establishing a curriculum of six years (eighteen terms) and continued in the curriculum the study of chemistry, physics, and biology as applied to medicine.

At present the length of the medical curriculum varies in different universities from thirteen to eighteen terms. In anatomy, physiology, pathology, and materia medica and pharmacology India shows to great advantage, and the laboratories are generally satisfactory in building and equipment. Hygiene is taught usually by the officers of the public health department in the respective provinces, and the teachers are well qualified and experienced. Forensic medicine—a very important subject in India—is taught by lecturers, usually the civil surgeon or his assistant, or by the police surgeon in addition to his ordinary work. The teaching in systematic medicine, surgery, and midwifery is along lines similar to those followed by medical schools at Home twenty years ago. In practical midwifery there has been an improvement during the last five years. Madras has an excellent maternity hospital, and in Bombay the new Wadia hospital will provide opportunities for teaching second to none. The teaching of midwifery and gynæcology in the Calcutta Medical College is at a high level, and in Lahore an excellent modern maternity hospital is well on the way to completion, but in Lucknow things are not so far advanced.

So far as hospitals in general are concerned, Sir Norman Walker says that some of the new ones are really excellent, and India is to be congratulated on its hospital architects. The ophthalmic department is nearly always a special feature of Indian hospitals. In Madras the ophthalmic hospital, thanks to the zeal and perseverance of Colonel R. H. Elliot and his successors, is one of the finest in the world. The special departments for diseases of children, ear and throat, skin, venereal diseases and tuberculosis, have a long way to go to catch up with ophthalmology. The arrangements for the teaching of mental diseases also leave much to be desired. There are many large asylums in India, but they are rarely in close proximity to the medical colleges. With regard to research, Calcutta has one of the foremost schools of tropical medicine in the world, and institutes at Kasauli, Bombay, and Madras are all doing admirable work, but it is greatly to be desired that research should be active in many centres, notably the universities.

On the general subject of organization of medical education Sir Norman Walker states that what India lacks is a co-ordinating authority between the universities. That universities should be independent and should follow the lines which seem to them most fruitful is generally admitted by educationists, but when medicine is concerned the public interest is involved to a greater degree than with any of the other faculties. Here independence and autonomy must be combined with a minimum standard maintained for the public benefit. Some more satisfactory basis than periodic visitation and inspection through the direct agency of the General Medical Council should be found. The number of medical colleges has doubled since Sir Norman Walker's first visit of inspection to India in 1922, and the need for setting up some co-ordinating authority comparable to the General Medical Council, with which the Council could communicate, grows more urgent. The absence of any such directing authority in India is really the chief obstacle to a satisfactory solution of the problem. Pending the setting up of such a body, he suggests that a commissioner of medical qualifications and standards with a permanent office at Delhi should continue and extend the work already done by the Council's inspector, Colonel R. A. Needham, who has just completed the last of a series of visits and reports extending over a period of five years, and is now at Home on long leave. The General Medical Council would willingly accept the suggested commissioner as their visitor, until a central authority can be established, and his regular reports would be of much assistance in determining whether or not recognition should be accorded or continued.

The Control of Malaria.

By S. P. JAMES, M.D.,

LIEUT.-COL., I.M.S.

(*British Med. Journ.*, 27th Aug., 1927, p. 347.)

At the recent annual meeting of the British Medical Association held in Edinburgh, Lieut.-Col. S. P. James, I.M.S. (Retd.), read a paper before the section of Tropical Diseases on the conclusions of the Malaria Commission of the League of Nations regarding the problems of malaria prophylaxis. We think that the following summary of Col. James' paper may prove of interest to our readers.

(1) One of the first and most important conclusions stated by the Commission is that at the present time, in the vast majority of the numerous regions where malaria prevails, antimalarial measures should be limited to an endeavour to reduce the severity and, so far as may be possible by the same measures, the incidence of the disease. They are of opinion that measures designed to accomplish more than that (and particularly measures aiming at "eradication") are not a wise proposition, and can be justified only in very exceptional circumstances.

(2) A second conclusion of general interest is that it is not always necessary to deal with malaria by a method arising directly out of the knowledge that the disease is transmitted by mosquitoes. In this connection the Commission cites various regions and localities in which, in the past, malaria was robbed of its importance as a cause of sickness and death without any knowledge of the ætiology of the disease, and without any reduction of anopheles having occurred, as well as various localities in which the same result is being brought about to-day. The Commission observes that, since the advent of the knowledge that malaria is transmitted by mosquitoes, there has been a tendency to forget that there are many methods of dealing with the disease, and that some of them are effective even without an attempt being made to reduce mosquitoes. Therefore they are of opinion that in certain circumstances it is very desirable for antimalarial workers to throw off the tyranny resulting from the general belief that because mosquitoes carry malaria their elimination should be the chief object of concern and expenditure.

(3) A result of the Commission's inquiries which is closely related to the conclusion just stated is the recognition that there is not yet any single method of malaria control which can be described as being superior to all others and therefore to be adopted in every country. There are, as has already been said, a number of methods of control, and some of them are constantly being improved. Each or any of them may, either wholly or in part, render valuable service in a country if it is a method well suited to the local conditions. This suitability or adaptability to local conditions is one of the most important matters to be considered in a choice of methods, and it is essential to the success of the method chosen. Malaria control is a *local problem* to a much greater degree than is the case with the control of other infectious diseases. Therefore in every country, and very largely in every area, there must be preliminary examination to ascertain the local conditions before deciding what method of malaria control is best adapted to them.

(4) The question arises whether it is better to utilize several of the known antimalarial methods at the same time, or to concentrate all available effort on one carefully selected method. This is a specific question which was put to the Commission by the public health authorities of several countries visited. The answer given was that, in the opinion of the Commission, it is better to limit the action taken to one or two selected methods, which can then be brought to a high degree of perfection. If, after a fair trial, these one or two measures are found to be insufficient to rob the disease of its practical importance from the public health point of view, further methods can be systematically added until the desired end is attained.

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(5) As regards the particular methods of malaria control to be adopted in any country or area, the Commission considers that there should be considerable freedom of choice. It deprecates the adoption of measures in a country on the ground that they have been successful in another, whether, perhaps, circumstances and conditions are quite different. Each country, and to a more limited extent each locality, must "work out its own salvation" in this matter, and the suggestion is made that countries and localities should do so in greater degree than has hitherto been the case. On this point the Commission states that in some of the countries which they visited there was evidence of an endeavour to follow too slavishly the antimalarial policy adopted in some other countries without ascertaining its suitability to the local circumstances and conditions, and in some instances without interpreting correctly its purpose and without giving full weight to the considerations which determined its adoption. As an example, they note that, in the world generally, there is a widespread misapprehension regarding Italian antimalarial methods, and that, in some countries, money, energy, and time have been misapplied in the false belief that the Italian example was being followed.

(6) It is usual to classify antimalarial measures as direct and indirect. The Commission adopts that classification but defines the terms more strictly than is usual. In the Commission's view there are only two direct antimalarial measures—namely, killing the malaria parasite in man, and killing the malaria parasite in infected mosquitoes. In comparison with these two measures, anything else that can be done to control malaria is necessarily indirect. For example, no one who has made a particular study of antimalarial campaigns can doubt that general antilarval measures in the field, as usually carried out in practice, are an indirect method of trying to deal with human malaria—that this line of action is concerned with something which is remote from the particular knowledge of the etiology and epidemiology of malaria which we are fortunate enough to possess to-day.

(7) Adopting this restricted definition of direct and indirect means of controlling malaria, the Commission suggests that in every malarious locality certain direct methods, which they term "primary measures" and which are concerned with malaria-infected individuals and the interior of the houses in which they live, are indispensable. As regards measures relating to malaria-infected individuals, the Commission considers that, whatever else it may be possible to do in malarious localities, the first and most important thing to do is to arrange for the treatment of cases of the disease. In rural areas and localities under primitive conditions the State must make these arrangements, according to the means available, but at least an efficient arrangement for the gratuitous supply and effective distribution of quinine is indispensable. The Commission considers that in organized communities satisfactory diagnosis as well as treatment should be arranged for, and suggests that, wherever possible, the services of private medical practitioners already established in the locality should be utilized and paid for by the State for this work.

(8) The Commission recognizes that no useful purpose would be served by magnifying unduly the results that may be obtained by those arrangements for ensuring early discovery and effective treatment of cases and carriers. They have ascertained that, in the countries which they visited, nothing is more striking than the mild character of the manifestations of malaria in a locality where there are practising medical men who are fully equipped as to the diagnosis and treatment of the disease, as compared with the severe and often fatal manifestations in a similar locality which is without that expert medical aid; but they realize also that the good results are more apparent in the reduction of severity and mortality than in the reduction of incidence. This is not surprising in view of the knowledge that quinine is not an effective prophylactic for new infections or relapses, and in view of the difficulty of attaining the "minimal effective standard" in the execution of the measures. Regular inspection of school children and of organized classes of the adult population must be part of the system, and an endeavour must be made to follow up all patients in their homes. The officer who is in charge of the measures will need assistants, especially for house-to-house inquiries. In some countries duly qualified female "health visitors" who have received the necessary training may be usefully employed in this work. In small districts the office can be combined with kindred health duties, such as school nurse, tuberculosis visitor, etc.

(9) The other "primary measure" which the Commission recommends is the systematic killing of adult female anopheles mosquitoes which can be found in the interior of dwelling-houses. It would take too long to describe in this paper the epidemiological and experimental grounds on which the Commission has arrived at the conclusion that this measure, if it could be effectively carried out, would have very remarkable results. As to the manner in which it should be done, the Commission considers that, wherever it may be practicable to persuade householders themselves to undertake it, that arrangement is preferable to an organized arrangement by the authorities for killing mosquitoes in houses by periodic fumigation or other means. In the Commission's view the measure should be regarded as an important item in the sanitary education of the inhabitants of malarious areas. The Commission thinks that it should be a duty of the medical men and assistants who visit households to explain to the occupants how malaria is contracted and spread, and to demonstrate to them how to find and kill the adult anopheles mosquitoes which are present in the house. It should be explained also how to make the house inhospitable to anopheles by removing cobwebs and dirt, clearing out recesses and dark corners, whitewashing, arranging for more light and air, and other simple means suitable to the particular locality and type of dwelling. Female health visitors and health nurses, who have been properly instructed and trained, can do a great deal of good by instructing householders on these matters. The aim should be to teach the inhabitants to have the same dislike and objection to the presence of gorged and sluggish mosquitoes in their houses as cultured people already have to the presence of bed-bugs, lice, and other harmful and disgusting vermin. If this educational propaganda is successful, it may be hoped that in time the killing of anopheles mosquitoes in houses will become a routine part of the housewife's daily task, just as much as other more showy, but less useful, items of sweeping, brushing, and cleaning. The measure has the advantage of costing nothing. It is known, from the results of experimental laboratory work, that one infected mosquito can give malaria to as many as thirty persons; therefore it is difficult to praise too highly any person who succeeds in killing even one of these infected insects.

(10) As regards these two primary or direct measures, the Commission is well aware that there is nothing particularly new or original about the idea of endeavouring to combat malaria in the houses of the people themselves rather than in the general environment. They realize also that it is often a difficult matter to get into the houses of the people, to examine all the occupants, to treat those who are found to be infected, and to teach them to catch and kill the mosquitoes which may be hidden in inaccessible places. But no royal road or short cut to the prevention of malaria has yet been found. Therefore, in the opinion of the Commission, it is necessary for the present to continue to endeavour to combat the disease itself at its sources in the human and insect hosts.

(11) The Commission has carefully considered in what circumstances any other measures than those dealt with should be recommended, and what those measures should be. On this subject reference is made in the first place to the problem of what should be done in regions where the conditions in which the people live and work

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are so primitive, and their economic position and social status and culture are so poor, that it is not possible in practice to apply direct antimalarial measures in a manner which enables them to be brought to the "minimal effective standard." Except the free distribution of quinine, no effective antimalarial measure can be applied in these regions until the land has been brought into such a condition that it is worth the while of the inhabitants to settle permanently upon it, and until those permanent settlers have reached a fair standard of housing and living. Nothing is more favourable to a high incidence and severity of malaria than frequent movements of a population hither and thither in search of a bare living, and very few things have a greater effect in reducing malaria than the stability of the population which comes when a place where the conditions of life are tolerable is found. Agricultural reclamation of the land, so that people may be settled permanently upon it with a fair prospect of gaining a livelihood, and perhaps a decent house and moderate comfort, is, therefore, a measure which tends indirectly to produce a great reduction of malaria. In general, the better the agricultural reclamation is carried out from the point of view of increasing its productiveness, the quicker will malaria seem to disappear as an important cause of sickness and death—provided always, of course, that the people themselves share in the improved prosperity by being able to adopt a higher standard of housing and living. It is hardly necessary to say that, when reclaimed land is worked by hired labourers who receive only a small daily or weekly wage and live a life of great hardship in temporary huts and hovels, there is no improvement of malaria among them. Indeed, in the tropics (and even in some parts of Europe) highly cultivated areas where these conditions obtain continue to be among the most malarious in the world. This indicates that the actual measures necessary for agricultural reclamation or improvement of the soil (drainage, etc.), are not the factor which causes the health of the people to improve, but that the good result is due to the better conditions of living and housing which the increased productiveness of the soil enables the people to obtain. In this connection the Commission notes that the changed conditions of life just referred to, and the subsequent reduction of malarial incidence and severity, have often been brought about in the absence of any measures intentionally based on modern knowledge of the etiology and epidemiology of malaria, and they illustrate this truth by describing a small scheme of "bonification without antilarval or other antimosquito methods" which was demonstrated to them during their tour in Sicily. The place is now an example of "anophelism without malaria." For these and other reasons the conclusion to which the Commission has come is that, of all indirect methods of reducing malaria, most importance must be attached to general schemes which aim at improving the economic and social conditions of the people and their general well-being and standard of life.

(12) The Commission has ascertained that almost everywhere in the countries which they visited terms like "bonification," "assainissement," etc., are misunderstood and misinterpreted except in the particular countries where the terms originated. They find also that in some countries the false belief still prevails that the actual measures which are necessary for making land more suitable for cultivation and more fertile are the means by which the reduction of malaria is brought about. In particular the drainage which is necessary for agricultural land reclamation is often credited with being the chief agent concerned. It is assumed that the drainage acts by reducing the breeding places of anopheles mosquitoes. In support of this belief it is often said that even the ancients knew that drainage reduces malaria, and that this antimalarial action of drainage was explained when the rôle of the mosquito was discovered. One result of the belief is that some countries have adopted drainage on a large scale as their first line of attack against malaria. The Commission does not desire to limit the output of public works of proved utility, but, having regard to the financial aspect of its mandate, they are equally unwilling that countries should continue to believe that the kind of drainage which is necessary for agricultural reclamation of the soil is an important antimosquito measure. For it is now known, unquestionably, that the open ditches and canals by which swamps and marshy areas are drained for agricultural purposes are often more prolific breeding places of anopheles than were the original swamps themselves. The Italians are well aware of this. They do not regard the "large bonifications" as an antimosquito measure, and they know that such a bonification may increase the abundance of anopheles in the area reclaimed. But they know also that in an area where bonification has been completed, and where, in consequence, the inhabitants settle permanently in better houses and in all the other circumstances of a moderately good standard of life, malaria tends more or less quickly to lose its importance as a cause of sickness and death. This good result more than compensates for an increase in the abundance of anopheles in the general environment. Thus it appears that the measures themselves are only a means to a definite end which is to be pursued despite the knowledge that some of the measures may be of a kind which actually favours the incidence and spread of malaria.

(13) The Commission deals in separate chapters of the report with various other problems of malaria prophylaxis, particularly with the organization necessary for the work, and with different antimalarial and antimosquito methods—such as quinine treatment and prophylaxis, larvicides, the applicability of antilarval measures, housing as an antimalarial measure, and propaganda.

(14) For various reasons which are given in the report, the Commission is unanimously of opinion that the scientific study of malaria must be continuously pursued in the laboratory and the field. They consider that the best prospect of discovering a method of dealing with malaria which can be applied in affected localities with the small amount of money and means that can usually be provided, lies in renewed activity in the study of the disease in all its aspects. Therefore they suggest that each Government which has not already done so should establish a small central permanent organization of selected workers who would devote their whole time to malaria research. In this connection they suggest (*a*) the establishment in one or two malarious areas of each country of an "observational station" where certain routine epidemiological inquiries should be made at regular short intervals for several years; (*b*) the establishment in each country where malaria is used therapeutically of a laboratory for the cultivation of a pure strain of malaria in mosquitoes, to be used, under expert supervision, for the purposes of the treatment. The establishment of such a laboratory in a properly organized hospital automatically provides an opportunity of studying the clinical and parasitological features of malaria contracted in the natural way, as well as the circumstances governing the infection of anopheles and the persistence of the infective virus in those insects. It also enables a satisfactory study to be made of the action of quinine and other drugs which are used for the treatment of malaria. Examples of each of these institutions are described in the report, as well as an example of a station for "experimental malaria control."

League of Nations.

Report of the Meetings of the Eighth Session of the Health Committee, held at Geneva in October, 1926.

THE Health Organisation of the League of Nations is doing very excellent work, but there is a feeling that much of this work is unknown even in educated circles, and a danger that this organisation may in time be regarded like every other health organisation; to be left alone and only taken notice cursorily say once a year. But the investigations and enquiries undertaken by the

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Health Committee are no ordinary routine. They are carefully chosen because of their fundamental or urgent importance, and it is disappointing that the world at large is not better acquainted with this work. The composition of the Committee is a guarantee of the soundness and the authority of its opinions and conclusions. The work for 1926 includes medical, epidemiological, biochemical, and statistical problems of international concern, and the report is very interesting to every branch of the profession.

The report of the Malaria Commission has been issued separately and is reviewed elsewhere in our columns. Its further studies will consist of (*a*) malaria in deltas; (*b*) major sanitary measures in malaria; (*c*) laboratory problems; (*d*) relations between meteorological conditions and malaria.

An important commission is investigating the standardisation of biochemical products, and various anti-sera (dysenteric, scarlet fever, tetanus, whooping cough), are being examined to determine their efficiency and if possible to fix uniform standards for these.

A special report has been submitted by Professor Calmette regarding tuberculin, some standardisation of which seems very desirable. A similar examination of the various methods of preparation and standardising vaccine (small-pox) lymph are under examination and some uniformity in potency and purity is being aimed at. In some countries (Holland and Germany) cases of encephalitis have been noticed in conjunction with vaccination and some Dutch observers are of the opinion that the conjunction is real. The enquiry is proceeding.

With regard to the International List of Causes of Death, this was drawn up by the International Institute of Statistics who are apparently rather jealous that no outside agency should encroach on its preserves. A joint meeting of the two bodies is to be convened however to discuss the improvement of the list which is highly desirable. A special feature of the Committee's activities is the arrangement of interchanges of public health personnel of various countries. An interchange of sanitary engineers has already been held, and a party of port health officers visited the basins of the Baltic and the North Sea. This year a party of health officers is visiting India. There is also a proposal to institute international continuation courses in public health in various countries. It is suggested holding the first of these in Paris, the language used being French.

A conference of health experts on Infant Welfare submitted important resolutions. It was agreed to study the various immunisation processes against infant and child diseases and a comprehensive enquiry into the various causes of infantile mortality in Europe was recommended. Unification of Infant Death Registration and adoption of a uniform definition of "dead birth" were also recommended.

An interesting discussion took place on a proposal to establish an Epidemiological Bureau for Africa in Algiers. Information regarding infectious disease on the East Coast of Africa is at present transmitted to the Singapore Bureau but such information for the rest of Africa is not furnished anywhere. Algiers seems suitable to collect such information from Western and Northern Africa. Such would be valuable not only to the States participating but to many Mediterranean Countries. It was agreed that work of an experimental nature might be carried out first before the Committee committed themselves to a definite proposal.

The above indicates in some measure the activities of the Health Committee of the Health Organisation of the League of Nations, and it is necessary that every country should realise the importance of the work which is bound to extend year by year as the benefits arising from international co-operation and agreement in public health work are realised.

A. D. S.

Tuberculosis and Venereal Diseases in Pregnancy.

(*British Med. Journ.*, 13th Aug., 1927, p. 247.)

THE importance (*a*) of tuberculosis, and (*b*) of venereal diseases in relation to pregnancy was discussed in the section of Obstetrics and Gynæcology at the Annual Meeting of the British Medical Association held in Edinburgh in July of this year.

(*a*) Pregnancy has an unfavourable effect on tuberculous patients, leading to aggravation of symptoms and the production of fresh lesions. The reason is not quite clear but it has been shewn that a comparatively high proportion of pregnant women lose the capacity of giving a positive skin reaction to tuberculin, recovering it only some time after confinement.

The flaring up of the disease may be only temporary; it may be limited to the reappearance of some bacilli in the sputum, which had remained sterile for a long period before, to a transient loss of weight with abnormal temperatures. But it may also be, and it too often is, quite serious, characterized by the rapid extension of the existing lesions or by the appearance of severe lesions in the hitherto sound contralateral lung. Many a woman, who had the most favourable prospects for making a complete recovery has lost all her chances and has died because of an intervening pregnancy.

Regarding the treatment of pregnant tuberculous patients, artificial pneumothorax, though far from ideal was considered to be preferable to the iduction of abortion.

(*b*) *Venereal Diseases: I. Syphilis.*—The frequency of this disease in the average ante-natal clinic in Great Britain is at most 5 per cent. The diagnosis is made on the clinical and obstetric histories and on the results of the Wassermann reaction. The last mentioned is not absolutely infallible: a small proportion of patients whose blood serum is negative subsequently give birth to syphilitic children.

Examination of the products of conception is considered to be of great value, but stress is laid on the fact that the placenta of a live syphilitic infant may appear to be perfectly healthy both to the naked eye and miscroscopically: the pale, greasy, bulky placenta typical of syphilis and caused by endarteritis obliterans of the fœtal capillaries in the chorionic villi is found only in the macerated fœtus. The presence of round cell infiltration around the walls of the umbilical vein is important, and should be looked for by miscroscopic examination of a piece of cord taken from as near the fœtal end as possible. In the fresh dead fœtus or the dead infant the most typical changes are found in the liver, lungs, thyroid gland and pancreas.

Treatment.

In treatment four main principles should be borne in mind.

(*a*) It should commence as early in pregnancy as possible, or, better still, a full curative course of treatment should be completed before pregnancy is allowed.

(*b*) The patient should be treated by arsenical compounds in every pregnancy—no matter whether she seems cured or not.

(*c*) Treatment may be continued with perfect safety up till the time of confinement.

(*d*) Arsenic and mercury or bismuth should not be combined in treatment, on account of their tendency to damage the kidneys. In this respect bismuth and mercury are more dangerous than arsenic; if there is no albuminuria, however, they may be given alternately. If there is albuminuria it may be necessary to stop all treatment, except by potassium iodide, so long as the albuminuria lasts. In some rare cases the albuminuria may be due to syphilis, and then arsenical treatment, carefully watched, may be tried.

Method of Treatment.—The best results are obtained by the use of novarsenobenzol intravenously, starting with a small dose of 0.3 or 0.45 gram, and increasing carefully to 0.6 or 0.75 gram. The injections should be given once weekly, and continued until six or eight doses are given. A careful watch should be kept for

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albuminuria. After this there should be a month's interval, during which mercury in the form of 10 minims of grey oil (corresponding to 1 grain of metallic mercury), is administered intramuscularly into the buttock once weekly, the site of injection being massaged so as to aid absorption. Intramuscular bismuth—preferably one of the insoluble compounds such as bicreol—may be given as an alternative twice weekly. In the case of both bismuth and mercury treatment the most careful attention should be paid to the state of the teeth. These courses of arsenic and mercury or bismuth should be given alternately until the end of pregnancy. After delivery treatment should be continued; a course of treatment of eighteen months' duration, as outlined above, is the minimum, and it is well to continue treatment for a year after all tests are negative. In the case of husbands with old and probably cured syphilis it is well to advise a prophylactic course as a safety measure for some weeks preceding marriage. Finally, it must be emphasized that there is no proof of the cure of syphilis except reinfection, and that antisyphilitic treatment should be repeated in every pregnancy, no matter whether apparently cured or not.

II. Gonorrhœa.—Gonorrhœa in pregnancy seldom gives rise to acute symptoms such as cystitis. Infection usually occurs primarily (*a*) in the ducts and glands of Bartholin; (*b*) in the urethra and periurethral gland, especially Skene's glands; (*c*) in the racemose glands of the cervix.

How to Examine a Case of Suspected Gonorrhœa.

Examination can only be properly carried out with the patient in the lithotomy position, and in a good light. In private practice this position can easily be obtained by a pair of lithotomy straps. The gland of Bartholin is first examined by picking up the labium majus at the junction of its posterior and middle thirds between the finger and thumb. Normally the gland is not palpable. If any enlargement is felt it is almost invariably due to gonorrhœa. It may, if only slight enlargement and induration are present, be caused by very old-standing infection.

Next the orifice of the duct should be examined; this is a pin-point opening at the junction of the hymen with the labium minus, near the posterior end of the latter. An area of rosy redness spreading on to the adjacent mucosa is suspicious, but it is not so strong evidence as enlargement of the gland. It may be possible to squeeze a little pus from the duct; if so, it should be spread on a glass slide and allowed to dry in air, being afterwards sent to a bacteriologist for examination.

The urethra should next be examined, care being taken that the patient has not passed urine for three hours. The urethra should be milked from the neck of the bladder downwards to the external meatus, and if pus is obtained a smear, and possibly a culture, should be taken. The absence of Bartholinitis and urethritis, however, by no means excludes gonorrhœa.

The cervix should then be examined, preferably using a bivalve speculum, which gives the best exposure. In acute infection it usually appears purple and congested, and bleeds on touching. In more chronic cases there may be actual desquamation of epithelium, the well known erosion. Often it is bathed in mucopurulent secretion. A swab must be taken from the cervical canal, care being taken not to trespass above the internal os. Smear or culture is again made. The cervix, however, may look perfectly normal, and yet gonococci may be obtained from the canal. A swab merely from the vagina is generally of no value whatever in excluding gonorrhœa.

What is the value of a negative smear? A negative smear is of little value in diagnosis and it should be repeated on at least three successive occasions. The gonococcus is most likely to be found just after a period, but this test is not available in pregnancy. We may, however, give a provocative injection of 200 million gonococcal vaccine and examine the discharge twenty-four, forty-eight, and seventy-two hours later. If in doubt regarding the diagnosis it is always better to treat the case as if it were gonorrhœal.

Treatment.

The multiplicity of remedies in gonorrhœa is evidence that none is very efficient. Almost the weakest antiseptic will kill the gonococcus if it can be brought into contact with it, but the organisms lie entrenched in the periurethral or cervical glands beyond the reach of most local applications.

The patient should be in the same position as for diagnosis and the external genitals cleansed with a solution of lysol or mercury perchloride. With a bivalve speculum the cervix is exposed, and from it and the vagina all mucopus is wiped, either with a dry sterile swab or with sodium bicarbonate solution. The latter removes mucus better and leaves a clean surface. The portio and vagina should now be swabbed with a silver or other preparation, such as 10 per cent. protargol or neoprotosil, or 1 per cent. picric acid in spirit: as good results are obtained by swabbing with saline solution. In pregnancy the parts must be handled very carefully, and special care be taken in making application to the cervical canal, lest premature labour be induced. One may, however, very gently swab the canal, using a Playfair's probe dressed with cotton-wool dipped in the selected solution, and rotating the probe carefully. It is rare to find urethritis persisting at this stage, but if it is, it may be necessary to inject, with a glass syringe carrying an acorn nozzle, a silver or other preparation such as 1 per cent. picric acid or 1 in 1,000 acriflavine, or 1 per cent. silver protein; or, as an alternative, medicated urethral bougies may be used containing 10 per cent. neoprotosil or any similar preparation. Sometimes there is a chronic infection of Skene's ducts, and it is necessary to inject them by means of a blunt-pointed hypodermic needle, or they may be destroyed with a cautery. Finally, the cervix and vagina are dusted with an astringent dusting powder such as dermatol, which helps to keep the surface dry. Twice a week is generally sufficient for local treatment, and in most cases there is no need for rest in bed.

Detoxicated vaccines are of considerable assistance in clearing up the discharge, starting with a dose of 5,000 million, repeating once weekly, and gradually increasing to 50,000 million, which may be continued till the end of pregnancy.

With the treatment outlined above it is almost always possible to get the discharge cleared up in a few weeks, and before delivery occurs. Very few of the cases cause trouble in the puerperium.

Douching is dangerous, and less effective than the method above described, and should have no place in the treatment of gonorrhœa in pregnancy.

Finally, it must be emphasized that the only absolute test of cure of gonorrhœa is the absence of the power to reinfect the male, and that treatment must be continued after pregnancy is over until at least all clinical evidence of disease is eradicated.

Bismuth in the Therapy of Syphilis.

By Dr. D. LEES, D.S.O., M.B., F.R.C.S. (Edin.).

(*British Med. Journ.*, 20th Aug., 1927, p. 298.)

IN a paper read before the Section of Venereal Diseases at the Annual Meeting of the British Medical Association at Edinburgh, Dr. Lees summarises the present position of bismuth in the therapy of syphilis.

(1) Bismuth is an active antisyphilitic drug and is more rapid in its destructive action on the *Spirochæta pallida in vivo* than mercury; it is not so rapid as the salvarsan group of drugs in this respect.

(2) Bismuth influences the surface lesions of syphilis as rapidly as the arsenobenzols, and more rapidly than mercury.

(3) Bismuth, with few exceptions, is less active than the arsenobenzols in influencing the Wassermann test, but is more active than mercury in this respect.

(4) The combined administration of bismuth and arsenic is more potent than either drug alone and is

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free from danger if given in therapeutic doses. The same holds good of arsenic and mercury.

(5) The administration of metallic bismuth in isotonic glucose solution is remarkably free from pain and side-effect, and in this respect is better tolerated than either arsenic or mercury.

(6) Bismuth is a very valuable drug in cases of syphilis which are intolerant to treatment by arsenic or mercury.

(7) Bismuth is a very valuable drug in the treatment of any patient who has advanced organic disease, whether the latter is due to, or is intercurrent with, the syphilis.

(8) The intramuscular injection of an insoluble compound of bismuth gives better therapeutic results with less risk of toxic effects than other methods of administering it, such as the intravenous administration of colloidal bismuth or the intramuscular injection of the salts of bismuth.

(9) The addition of bismuth and its salts to the other available methods of treatment does not as yet justify anyone in lessening the length of time over which every case of syphilis should be treated and kept under observation.

(10) Apart from cases of intolerance to other drugs, bismuth is only an adjuvant to the treatment of syphilis and should not be used alone, even in the very earliest cases of infection.

A Study of Congenital Syphilis.

By A. BENSON CANNON, M.D.

(*Journ. Amer. Med. Assoc.*, Vol. 89, No. 9, 27th Aug., 1927, p. 666.)

IN a recent number of the *Journal of the American Medical Association*, Cannon gives an account of his studies of two hundred and two cases of congenital syphilis.

His conclusions may be summarised as follows:—

(1) In a study of 202 cases of congenital syphilis representing 181 mothers, it was found that the more recent the infection in the mother the more frequently the children were affected and the severer the type of infection.

(2) Only 23 per cent. of the mothers had received treatment before or during pregnancy.

(3) The greater number of these cases represented the first pregnancy.

(4) The average age at which symptoms developed was between the tenth and fifteenth years.

(5) Ninety-one per cent. of the patients were normal mentally.

(6) Interstitial keratitis was the most frequent symptom, occurring in 35 per cent. of the cases.

(7) Dental defects were the most common physical sign.

(8) The Wassermann reaction and organic luetin tests were strongly to moderately positive in all except two cases.

(9) Spinal fluid tests were positive in 10.5 per cent.

(10) The plan of treatment was continuous.

(11) There were fourteen cases of syphilitic nephritis. All were fatal and all were studied at autopsy.

(12) There were four cases of meningitis, all of which were fatal. Three were examined at autopsy.

CONCLUSIONS.

Generally speaking, the sooner after birth the child receives antisyphilitic treatment the fewer and less pronounced the late stigmas. If treatment is started during the first year of life, the child usually develops normally with little or no evidence of syphilis. As a rule, the older the child when treatment is begun, the more resistant the disease. It has been especially difficult to obtain a negative Wassermann reaction in those suffering from interstitial keratitis, even after prolonged treatment. Only six out of a total of seventy patients have become serologically negative, and these after from four to six years of almost continuous treatment with arsphenamine, mercury, iodide and bismuth. While the symptoms usually clear up and remain clear as long as the patient is under treatment, they are apt to recur when treatment is discontinued. One patient, a man aged 44, has been receiving treatment at intervals for more than fifteen years, and although he has not had a single clean negative Wassermann reaction he has not had any recurrence of interstitial keratitis. During this time he has had about seventy-five injections of arsphenamine, 150 of mercury, thirty-five of bismuth, and mixed treatments at intervals.

Usually when treatment was begun in early infancy, the Wassermann reaction became negative after about four courses of arsphenamine and mercury and remained so. A relapse to a positive Wassermann reaction after the serum has once become negative was rare, having occurred in only four cases of the series.

Although the symptoms of those suffering from neurosyphilis have either become less severe or have entirely disappeared under treatment, in no case has the cerebro-spinal fluid become negative. Meningitis has been fatal in all cases.

Congenital syphilis of the kidney was diagnosed during life in fourteen cases, and in each instance was confirmed by autopsy.

Not including the four patients who had a relapse to a positive Wassermann reaction, a negative result in 29 per cent. of the cases has been obtained.

Bismuth in the Treatment of Congenital Syphilis.

By CARRON S. WRIGHT.

(*Journ. Amer. Med. Assoc.*, Vol. 89, No. 6, 6th Aug., 1927, p. 424.)

DR. WRIGHT, in an important and interesting paper, gives his experience of the treatment of fifty-four cases of congenital syphilis by means of bismuth. Potassium bismuth tartrate was administered intramuscularly into the buttocks in doses equivalent to 5 mg. kilogram of body weight. Each course consisted of sixteen weekly injections, with one month's rest between courses.

Forty-seven of the cases whose ages ranged from two to sixteen years were examples of late congenital syphilis: all of them had had prolonged courses of various organic arsenic compounds but of the total only four showed a negative Wassermann reaction after this line of treatment. The remaining forty-three were put on bismuth treatment: of these twenty became negative, sixteen remaining so at the time of writing. The average number of injections necessary to produce this serological change is not stated. Interstitial keratitis responds very well to bismuth, and cutaneous lesions disappear with remarkable rapidity.

Untoward effects are rare. The injections are painless if properly given: occasional eczematoid eruptions were seen during treatment, and blue lines on the gums may develop—this last is not a serious manifestation. Albuminuria and anæmia, recorded by some observers, were not prominent features in this series.

The Treatment of Amœbiasis.

By P. MANSON-BAHR, D.S.O., M.D., F.R.C.P.,

and

E. G. SAYERS, M.B., CH.B., N.Z., D.T.M. & H.

(*British Med. Journ.*, 17th Sept., 1927, p. 490.)

RECENT advances in the treatment of amœbic dysentery were discussed by Dr. Manson-Bahr and others in the Section of Tropical Diseases at the Annual Meeting of the British Medical Association held in Edinburgh in July, 1927. These may be summarised as follows:—

Emetine is the drug of choice in acute amœbiasis and hepatitis, but is apt to prove disappointing in chronic cases. *Emetine-bismuth iodide* and *emetine periodide* have given fairly good results, particularly the former. *Yatren* 105 is safe from toxicity and relatively satisfactory. In Manson-Bahr's opinion, however, the best

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results are obtained by a combined treatment with emetine-bismuth iodide and yatren: the former is given orally in capsules, the latter is used as a rectal lavage. In administering emetine-bismuth iodide, there are certain precautions to be adopted—the patient should be absolutely at rest and no solid or liquid food should have been administered within 4 hours of taking the drug. The yatren lavage consists of 200 c.c. of 2½ per cent. solution; emetine-bismuth iodide is given every night and yatren lavages in the morning. Treatment is controlled by the sigmoidoscope.

Pain and Radiology.

By M. J. HUBENY, M.D.

(*Journ. Amer. Med. Assoc.*, Vol. 89, No. 4, July, 1927, p. 271.)

PAIN is a most important subjective symptom: its significance and the assistance in its interpretation which can frequently be given by roentgenography are stressed by Dr. Hubeny in a recent issue of the *Journal of the American Medical Association.*

With modern methods of diagnosis pain, which is a purely subjective phenomenon, can almost be classed as an objective symptom. Often, for example, pressure might elicit pain, or movement might produce it; regardless of the stimulation, the questions of the precise nature of the pain, where and at what times experienced, are important factors, and however subjective the pain might be from the standpoint of the patient, its interpretation always presents to the physician a problem in objective diagnosis.

Pain as the initial or outstanding symptom is common to many pathologic conditions not always easy to differentiate. The first consideration should be to determine whether the condition is medical and amenable to medical treatment, or whether the pain indicates the onset of some serious surgical condition that may require operative relief. For instance, a number of non-surgical conditions may cause upper abdominal pain, such as simple gastric indigestion, food or ptomain poisoning, or the ingestion of poisonous drugs or substances; or conditions above the diaphragm, such as pleurisy, pneumonia, pulmonary abscess or infarct, thoracic aneurysm, mediastinal inflammation or neoplasms, may produce pain in the upper part of the abdomen. It is therefore quite obvious that a method which can tangibly account for the pain is a valuable adjunct.

Diseases often present themselves in an atypical and bizarre manner: occasionally a pain syndrome is absent, or the pain is very severe or exaggerated from the standpoint of patient tolerance, or sometimes it is minimized by a hyposensitive individual.

There are many diseases in which pain is absent; so many complications and combinations, particularly in adult life, may co-exist that one must be on the alert to recognize them because of their influence on one another, affecting seriously the prognosis or occasionally prohibiting a serious surgical intervention. It is quite proper to mention just a few of these diseases, namely, pernicious anæmia, early sarcoma, and often carcinoma, in which pain is distinctly absent or mild and the termination fatal.

The foregoing remarks will impress one with the vagaries of that most important indicator of disease, pain.

The importance of referred pain is emphasised and a case is quoted in which the real origin of a pain in the hip joint region was revealed only by *x*-ray examination of the whole pelvis and femur when a metastatic carcinoma of the shaft of the latter bone was revealed: the patient had previously had a breast amputation for malignant disease. This case, together with others quoted, emphasises the necessity for examination not only of the actual seat of pain but also of structures in the neighbourhood.

Fractures present an interesting phase because some serious cases frequently occur with little or no pain. The author had two cases of what proved to be impacted fractures of the hip in which both patients walked into the office; one used a cane, the other had no assistance whatever, and both protested the needlessness of a roentgen-ray examination.

Fractures of the smaller bones occur often with little or no pain and very little disability, and it is legally and therapeutically unsafe not to have a roentgenographic examination.

It occasionally happens that a fracture of the lower end of the tibia, particularly a spiral fracture, is accompanied by a compensatory fracture of the upper end of the fibula. The latter is frequently overlooked because the major pain and apparent injury are at or near the ankle joint.

It is unwise to examine the skull roentgenologically over the scalp wound area only, because of the well known contrecoup fractures which happen only too often; in spite of the presence or absence of tender points and visible contusions one should always use a four way examination, at least.

A common experience of all roentgenologists is the frequent occurrence of pathologic dental conditions without any local pain; this, of course, is diametrically opposite to the experience of a dentist, because ordinarily a patient will consult a dentist for dental aches. Hence it is quite understandable why it has taken a long time to drive home to the dental profession the actuality of dental infections as direct or contributory causes of disease processes elsewhere.

By way of an opposite illustration, a thorough roentgenographic examination of an acute fulminating osteomyelitis will be valueless, because a time interval is necessary to produce demonstrable bone changes; in the meantime, the surgeon will be obliged to make a clinical diagnosis and proceed with the necessary medical or surgical intervention, because waiting for roentgen-ray confirmation might be disastrous to the patient.

Gastro intestinal *x*-ray examinations offer a fruitful field explaining many abdominal aches. The paper is an interesting one and will repay further study.

Atypical Malaria.

(*Journ. Philippine Isl. Med. Assoc.*, Vol. VII, No. 8, August, 1927.)

VITUG and Ignacio point out the baffling complexity of the picture presented by malaria in certain cases and quote instances from their own experience in which clinically the illness appeared to be (1) influenza; (2) typhoid; (3) cholecystitis; (4) acute multiple peripheral neuritis; (5) dysentery; (6) cerebrospinal meningitis; (7) encephalitis. The presence of malaria was only discovered after repeated blood examination: in one case the real cause was only discovered at autopsy. The protean nature of malarial manifestations, like those of syphilis, should ever be borne in mind and should be excluded by repeated hæmatological examinations before diagnosing the symptom complex, no matter how atypical, as non-malarial.

Malaria Control in Italy.

By PROFESSOR ARTURO CASTIGLIONI, M.D.

(*British Med. Journ.*, 13th Aug., 1927, p. 278.)

IN a recent number of the *British Medical Journal* Professor Arturo Castiglioni gives an interesting account of the measures adopted by the present Italian Government for the control of malaria in Italy.

These may be stated shortly as follows: (1) State distribution of quinine. (2) Classification of the disease as an occupational complaint, and as such carrying a right to indemnity. (3) Gratuitous supplies of quinine and assistance towards sanitation purposes for all workers and settlers inhabiting malarial zones. (4) Foundation of malarial research institutes. (5) Draining of possible anopheles breeding places. The breeding of cattle in malarious regions is regarded as important since researches have shown that certain mosquitoes prefer

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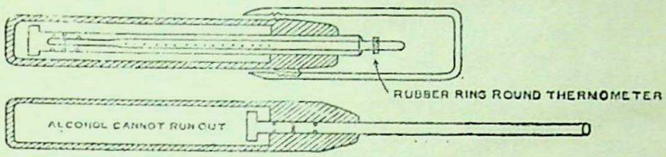
species other than the human. Studies in Italy have demonstrated that in places in which rice is grown the development of anopheles is much more marked—a finding which, if subsequently confirmed, will be of considerable importance to us in India. A sum of nearly four million lire (about Rs. 3¼ lakhs) per annum is obtained from the State sale of quinine and is subsequently employed in subsidies for antimalarial purposes.

An Alcohol-Bath Thermometer Case.

(*China Med. Journ.*, Vol. XLI, No. 7, July, 1927, p. 660.)

THE following simple piece of apparatus described and illustrated in a recent number of *The China Medical Journal* may prove of interest to our readers.

The thermometer case here illustrated is used, and recommended, by Dr. Daniels of Nanking. It is hard to distinguish in appearance from a fountain pen,—pocket-clip and all. It carries the thermometer in a bath of alcohol which does not spill when the case is either closed or opened.



The special feature in this device is that the case has an inside sheath of metal which contains the thermometer. This is perforated near the bottom to give access to the spirit, but when it is drawn out, the holes lie within the rubber cuff which closes the mouth of the outer case, and are so sealed.

Dr. Daniels adds that he finds the case apt to break when dropped on cement, though on one such occasion the thermometer within did not!

Reviews.

KALA-AZAR. A HANDBOOK FOR STUDENTS AND PRACTITIONERS.—By L. E. Napier, M.R.C.S., L.R.C.P., Kala-azar Research Worker, Calcutta School of Tropical Medicine. Calcutta: Oxford University Press, 1927. Pp. 203, with 5 coloured and 13 half-tone plates. Price, Rs. 6-8-0.

THIS admirable and badly needed book will be welcomed by all interested in the subject of kala-azar. The author is admittedly the leading authority in the world on the disease, which he has been continuously studying for the past seven years, and his experience is unequalled. Further, it is extraordinary what a volume of useful information he has managed to put together in the small compass of 203 pages. The book is exceedingly informative, and there is no aspect of the kala-azar problem which one will not find dealt with in its pages. Also its value, considering its low price and profuse illustrations, bring it within the reach of a very wide circle of readers.

The present volume is much more than a new edition of Napier and Muir's (1923) *Kala-azar;* for it has been completely re-written. Since 1923 the introduction of the pentavalent antimony compounds has revolutionised the treatment of kala-azar, whilst the incrimination of the sandfly *Phlebotomus argentipes* as the (almost certain) vector of the disease has opened up new and hitherto unexplored vistas in prophylaxis.

Chapter 1 deals with epidemiology and gives a brief review, illustrated with excellent maps, of the geographical distribution of the disease in the world, and its history. Factors influencing the distribution of the disease, such as altitude, rainfall, atmospheric temperature and humidity are then dealt with, followed by a discussion of its seasonal and age incidence. It is interesting to note that no less than 50 per cent. of cases in India occur in children of less than 15 years of age, though why the disease should almost exclusively affect infants of one or two years of age in the Mediterranean area remains unexplained.

Chapter 2 discusses the ætiology of the disease, and here both the morphology of the parasite, and the transmission problem are briefly but adequately dealt with; in fact this chapter—like all the rest of the book—is admirable for the amount of information contained within a restricted space. As *P. argentipes* has not yet been fully *proved* to be the vector of the disease, the author feels himself compelled to briefly discuss other possible means of transmission, though chiefly to their exclusion. Pages 43 to 46 give a summary of the author's well-known work on the environment of kala-azar, a work which is fundamental to the study of the transmission of the disease, and which is almost as important in pointing to sandflies as the probable transmitting vectors as the direct experimental work with these insects. The illustrations here again are very helpful.

Chapter 3 deals with morbid anatomy and histopathology, and here Colonel Acton has collaborated with Dr. Napier in presenting a most useful review of the subject, whilst the photographs of cases of dermal leishmanoid are admirable and very well reproduced. Chapter 4 deals with symptomatology; again an excellent and informative review. Chapter 5 gives a full account of laboratory procedures in the diagnosis of kala-azar, and again everything essential—the details of media preparation, of preparation and use of the Romanowsky stains, the technique of venipuncture and of spleen puncture, and the serological reactions in kala-azar—are all fully and adequately dealt with. Diagnosis and prophylaxis of the disease are then briefly dealt with in two short chapters, with admirable photographs of the environment in which kala-azar spreads; and in Chapter 8 the author comes to the subject of treatment. Here, as we expected, the use of the pentavalent antimony compounds and their comparative therapeutic values is first fully discussed in a well balanced and critical spirit. In general it may be said that whilst the cure rate with the trivalent compounds was about 80 per cent. and the time taken to cure a patient about three months, with the pentavalent compounds the cure rate is about 95 per cent. and the time taken to cure a patient about three weeks. The detailed technique for the use of the pentavalent compounds is given, and an account of the course of the disease under such treatment. The author then discusses the use of the trivalent antimony salts; this is necessary, since the high cost of the pentavalent compounds means that in many areas mass treatment of the disease will still have to be carried out with the trivalent salts. Subsidiary treatment and complications during treatment are adequately dealt with, and also the treatment of dermal leishmanoid.

The book concludes with a bibliography of about 170 references. Whilst this is not a complete bibliography, still it contains all the most important references, and is again an example of how much information of value the author has managed to condense into a small space. The index is again brief, but adequate.

The printing, general get up, and illustrations are on the whole good. But there is one awful blemish to which we cannot help referring; viz., the frontispiece. This purports to be a coloured illustration of an Indian boy suffering from kala-azar. In Napier and Muir's (1923) edition this trebly unfortunate patient was shown as suffering from a degree of jaundice which would probably be incompatible with life. In the present edition the publishers have gone to the other extreme; and the patient looks as if he was suffering from a mixture of acute argyrism and incipient purpura hæmorrhagica, with a patch of

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leucoderma on the nose, and seborrhœic dermatitis of the forehead. We have seen the altogether admirable original colour sketch, of which this terrible illustration purports to be a replica, and we are certain that the author must have got just as great a shock as we did when he saw the reproduction. That colour printing of the very first quality can be executed in India is shown by the publications of the Zoological Survey of India and the *Bombay Natural History Society's Journal;* but we honestly cannot compliment a press with such a reputation as that of the Oxford University Press on this awful illustration.*

The frontispiece, however, is a very minor blemish in an otherwise excellent, very practical, informative, and useful volume, on whose publication we must certainly congratulate the author.

R. K.

SOCIAL FACTORS IN MEDICAL PROGRESS.—By Richard J. Stern, Ph.D. New York: Columbia University Press, 1927. Pp. 136. Price, $2.25.

THIS is a book which we hope will be very widely read by our readers, for it is in every way one of the most thoughtful and admirable essays on the factors which retard or promote medical progress which we have ever read. And, at the present moment in India, when every "system" of medicine is clamouring for State aid, there is hardly a chapter or page even of this book which has not a direct bearing on the subject. Dr. Stern has placed the whole medical profession of the world under an obligation to him; for his analysis of the factors concerned should do much to assist future progress.

The book is divided into two parts; the first, and by far the largest section, deals with the factors which retard the diffusion of medical discoveries; the second and much smaller section, deals with the nature of medical progress.

Chapter I is one which we should like to quote from *in extenso,* since it is so admirable an introduction to what follows. Among the factors which retard the diffusion of new knowledge, first and foremost stands vested interest—not necessarily in the financial sense of the term only, but in the psychological as well. Even those who are best equipped with knowledge are not necessarily those who are the most receptive. On the other hand, ignorance creates apprehension, which in its turn intensifies caution. And in medical matters, where life and death are concerned, caution is more apt to be more extreme than in any others. Secondly there is the "reverence for authority;" a vice which has always chained the wheels of progress throughout the centuries. Thirdly our systems of medical education are never really up to date; textbooks are slow in assimilating new knowledge; teachers are apt to develop the "set mind," and there is the added fear of teaching new knowledge which may ultimately turn out to be of a fictitious sort. It is always easier for the professor to "hold fast to that which is proved" —however old fashioned—rather than grasp out after what he often fails to understand. Again, the herd instinct is nowhere better exemplified than in the medical profession at large; and this instinct, in its desire to stick to the beaten paths, is wont to bring social pressure, ridicule, and persecution to bear on the innovator. The innovator, knowing within himself the supreme value of his discovery, believes that the world will welcome it with open arms; only too often is it long after his death that the true merit of his discovery receives recognition. Even where there is no active opposition, the mere force of inertia in an organised profession is such that innovation tends to be resisted. Money may be a factor; "the fear of economic loss may restrain the innovator from projecting, the publisher from printing, the educational institution from supporting, and the prospective user from investing in the innovation." Lastly, the very personality of the inventor may be unpleasant, and "recognising the fact that it is much more dramatic and therefore more effective to discredit a personality than to refute an idea, opponents of innovation often use personality attacks as expedients to hide the actual causes which motivate them."

With his general thesis thus outlined, Dr. Stern turns to its more detailed exposition by illustration and precedent; and in Chapter II deals with "conservatism in medicine, a perspective." In some ways the doctor is less to blame than the chemist. "When one surveys the field of medicine and observes the chaos of conflicting opinions as to the ætiology and treatment of diseases, one recognises the plight of the physician who is desirous of being progressive. In the field of drug therapy the physician is especially perplexed. New drug and serum products are put on the market, enticingly advertised, endorsed by excellent authorities, substantiated ostensibly by experimental data. To investigate adequately the real value of these innovations is a prodigious task which is beyond the power of even the exceptional physician. His choice must be guided by faith in authority and by his experience with the drug after using it upon his patients. Meeting frequent disillusionment, he becomes cautious." And as for fashions and fads in medicine, the subject is endless. "When the gynæcologist studies the history of his field, he sees a series of 'crazes' and always a tendency to follow prevailing fashion. The uterine displacement craze, when every gynæcologist invented or modified a pessary for the treatment of backache or pelvic pain, was followed by a pelvic cellulitis craze which was widely taken up until it was exploded. Oöphorectomy, clitoridectomy, inflammation of the os and cervix uteri, operations for extra-uterine pregnancy and Cæsarian section, all were once prevalent fashions.....The medical man who is conscious of the fact that fads and fancies in medicine and surgery have followed each other in transitory popularity and who recognises the stupendous accumulation of medical knowledge, becomes conservative." And becoming conservative, he falls back upon authority, and now becomes hide-bound. History is replete with instances where the most prominent medical authorities of the time, through their influence, retarded innovations.

Again, agencies outside the medical profession may bring pressure to bear against the innovation. The church—with the exception of a few of its wisest and most thoughtful prelates—is usually on the side of reaction, and instances of how it has hindered medical progress might be multiplied a hundredfold. (Only the other day the Bishop of Ripon was pleading for a ten years' arrest of the progress of scientific invention, as if it was possible by bell, book and candle to arrest the incoming of the inevitable tide.) Also, "medical men cannot be conceived of as scientific machines living in a void. They are subject to the same social forces as are the people among whom they live, and have religious, political and economic affiliations and prejudices.....In this way other phases of culture influence the growth of medical knowledge." On the other hand, it cannot be said that the mass population in general is antagonistic to discovery; it is often so eager to take up some new alleged cure or specific that its support becomes positively embarrassing. "It has been correctly said that the average American citizen can believe firmly and simultaneously in the therapeutic excellence of yeast, the salubrious cathartic effect of a famous mineral oil, the healing powers of chiropractors, and in the merits of a corrective Eating Society. His catholicity of belief permits him to consider such palpable frauds seriously, and at the same time to admire and respect authentic medical education and even the scientific study of disease."

In Chapters III to X, Dr. Stern gives a fascinating account of the most celebrated controversies in

* Since the above was written, we understand from the author that the publishers have deleted this frontispiece from the edition, and are preparing a fresh plate instead.—R. K.

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medical history; this part of the book is exceedingly well written, and very well annotated. He deals in turn with the opposition to dissection; to Harvey's theory of the circulation of the blood; to Auenbrugger's use of percussion in the diagnosis of diseases of the lungs; to Jenner's introduction of vaccination; to the views of Holmes and Semmelweis—the latter of whom died a raving lunatic in an asylum on account of the persecution which he had endured at the hands of the medical profession—with regard to the contagiousness of puerperal fever; the opposition to Pasteur; to Lister's introduction of antisepsis; and to asepsis. They are wonderful chapters, and they illustrate every phase and factor to which he refers in his introductory outline. Finally, in Chapter XI, he sums up concisely and briefly.

Turning to Part II of the book, we are here presented with an analysis of the nature of medical progress. Medical history has until recently been for the most part a study of medical bibliographies. It is time that we took larger views, and traced streams of tendency rather than the lives of individuals. It is true that throughout medical history great individuals and great individual discoveries stand out pre-eminently; but behind them there can always be traced the inevitable forward urge of discovery, the spirit of progress. "The history of medicine consists essentially of a successive series of intellectual movements proceeding from different centres and each engulfing its predecessor. Our manuscript exhibits the Anglo-Saxon medicine in the actual process of absorption by the doctrines of Salermo. In another century, Salermo became lost in the intellectual invasion that spread from Cordova to Baghdad. The Arabian system again gave place to the Greek medicine that was received with the rise of Humanism, until Renaissance science was in its turn lost in that great flood of ideas introduced by the Experimental Method," he quotes from Singer.

The master mind may make the great discovery, but —preceding it—there have been years of spade work by others. Medical discovery is not made suddenly, but by a multitude of preliminary and progressive steps which in turn had their antecedents. Harvey's work on the circulation of the blood had to some extent been preceded by that of others; thus Cæsalpinus (1519—1603) used the term *circulatio*, and taught that the blood from the tissues returns to the heart by the veins alone; Fabricus ab Aquapendente, Harvey's teacher, had demonstrated in a complete manner the valves of the veins. The real merit of Harvey's method was that he corroborated and demonstrated by the experimental method the anticipations of others. The immunity which an attack of cow-pox conferred against small-pox was well known prior to Jenner's day, and he was not even the first to perform vaccination. Even Pasteur's work—magnificent and epoch-making as it was—was largely based upon the previous discoveries and the work of others. The "key" discoveries are dependent upon antecedent discoveries which are indispensable. But there comes a time when, pending a particular discovery or one of a class, further progress in a given field is impossible. It is then that the master mind finds the right key; and the cardinal discovery is followed usually by a whole flood of further discoveries and their applications.

Further, progress in any one field of medicine is often dependent upon progress and discoveries in other fields, or in other sciences; and very frequently upon the evolution of new apparatus, new inventions, or the refinement of previous instruments. One has only to look through the equipment of an ordinary consulting room, or a laboratory to realise how dependent the medical man is—and still more so, the medical discoverer—on a dozen and one trades and sciences.

Thus it comes about that the progress of medical discovery is not fortuitous. With the improvement of apparatus, the ever increasing knowledge of the subject, with active minds at work upon it, and intelligent anticipation in the atmosphere, there comes about a time when the discovery is almost bound to be made, if not by one worker, then by another; and the author gives an exceedingly interesting and instructive list of some multiple discoveries and inventions in the history of medicine. "Necessity, acting as a stimulus to research, cannot produce an invention or discovery without the existence of the essential elements in knowledge. It might therefore be said that in the history of medicine the variable factor, and therefore the cause of invention and discovery is not due to the sudden emergence of necessity, but to the fact that the required elements previously absent or unappreciated are found in culture, making the discovery possible."

Dr. Stern's book is one which should be read by every medical man imbued with the spirit of discovery. It is a sane and exceedingly interesting analysis of the social factors which make for or which tend to hinder medical progress. Its lessons have so important a bearing on the present position of medicine in India that we trust that the book will be widely read in this country. We profoundly deplore communalism in Indian politics to-day; we would even more deeply deplore the introduction of communalism into medicine in India.

R. K.

THE MEANING OF DISEASE.—By William A. White, A.M., M.D. Baltimore: The Williams and Wilkins Co., 1926. English Agents, Messrs. Baillière, Tindall and Cox, London. Pp. 221. Price, 13s. 6d. net.

THIS is a difficult book to review, although an interesting one to read. "It is no paradox to say that in our most theoretical moods we may be nearest to our most practical applications," quotes Dr. White from Whitehead; and his book is a striking and thoughtful exposition of the essence of the quotation.

The Victorian era was essentially a materialistic age, and medicine, in common with the other sciences, assumed a materialistic and mechanistic trend. Disease was interpreted in terms of disorder of structure and function. In the meantime the growth of specialism led to more and more ramifications of the tree of medical knowledge, until we have now reached a stage at which specialism dominates the whole science. "In medicine the movement has now, for a long time, been analytic, with the production of very few synthetic minds capable of utilizing the material so accumulated." View-points have become too restricted; we cannot see the wood for the trees.

To correct this tendency what is wanted is a general philosophy of medicine; to get outside our present narrownesses and to visualise the subject as a whole. And there is no use in going back to past philosophies of medicine; "science has evolved with such startling rapidity since the middle of the last century that it does not seem that an examination of these theories, for the most part antedating this period, would be of much value."

Man is not so much an individual as an existence; his life-span a period in time rather than an isolated fact. He consists of psyche and soma, mind and matter. And the psyche is the more important, since it is the site of *nascent* function, whereas the soma consists of structure adapted to function. "We must devote as much time and energy to a study of how best to use the marvellous powers of our minds as in the past we have devoted to the utilization of the forces of nature in our environment.....To accumulate this material no matter from what source or from what science, and to present it as a coherent body of thought bound together by general principles and natural laws is believed to be a worth while object. If this object can be attained by a presentation that is at once enlightening, and which carries conviction, it will serve to help to make conscious much of our thought which is now in that hazy zone more or less distantly removed from the field of awareness and the focus of attention, and so render it more available for use."

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In this object the author has succeeded admirably, and his book is a thoughtful one, well worth the study of those who are not content with a materialistic outlook in medicine. After chapters devoted to fundamental concepts, man's place in Nature, action and reaction, disease and adaptation, reversibility and irreversibility, disease and reversibility, the symptoms of disease, and the language of disease, the author comes to a final summary which is the most interesting chapter in the book. "Disease," he writes, "looked at from any angle we will, whether we view it as failure of adaptation or adjustment to the environment, whether as failure to measure up to internal standards of conduct—ego-ideals—whether it represents an inadequate integration of the organism, or as an inadequate integration of the individual as a social unit, however, we view it, it presents itself as inadequacy of some sort. This inadequacy may be organ inadequacy, mind inadequacy, social inadequacy, but inadequacy it seems always to be, and inadequacy expressed in terms of our energy concept must mean that the energy has been stepped down by disease to a lower tension; it must mean that in the last analysis disease is coterminous with the degradation of energy." The diseased state, in brief, is an attempt to secure energy equilibrium at a lower level than normal.

We trust that we have said enough of Dr. White's book to show its attractiveness to the thoughtful type of reader. It only remains to add that its standard of publication is worthy of the its well known publishers.

MEDICAL RESEARCH COUNCIL. SPECIAL SERIES. NO. 109. CHILD LIFE INVESTIGATIONS: A CLINICAL AND PATHOLOGICAL STUDY OF 1,673 CASES OF DEAD-BIRTHS AND NEO-NATAL DEATHS.—By E. L. Holland, M.D., F.R.C.S., F.R.C.P., and Janet E. Lane-Claypon, D.Sc., M.D. London: H. M. Stationery Office, 1926. Pp. 94. Price, 3s. 6d. net.

THE attention of the medical profession in this country should be specially drawn to the splendid series of special reports issued from time to time by the Medical Research Council of the Privy Council of Great Britain. This series, which commenced during the war and has been continued ever since, consist of small and cheap brochures reporting the results of investigations by many of the most eminent medical workers in Great Britain, and they cover a very wide range of both tropical and temperate zone diseases. They are works of outstanding authority, and present in a brief space summaries of our present-day knowledge of a wide range of subjects. Amongst other special subjects which have been dealt with are tuberculosis; cerebrospinal fever; dysentery; alcohol; venereal diseases; general bacteriology; rickets; child life investigations; radium; ventilation; reports of the salvarsan committee; a series of reports on the Wassermann test; a special report on surgical shock and allied conditions; reports of the air medical investigation committee; reports on accessory food factors (vitamines), on anærobic infections, on dental disease, and on biological standards. Taken together, these reports constitute a small library which should be part and parcel of every large medical library in India; and sections of which many medical practitioners and laboratory workers in this country will desire to possess. The Indian agents for this series are Thacker, Spink and Co., Calcutta and Simla; Thacker and Co., Bombay; and Higginbothams, Ltd., Madras and Bangalore.

* * * * *

The special report under review—No. 109—deals with the causes of still-births and of neo-natal deaths, as based on a study of 1,673 cases. In the preface to the report, the Medical Research Council write as follows:—

Very early among the investigations of child life undertaken by the Committees responsible for the Reports already issued in this group was an inquiry into the causation of pre-natal and neo-natal death. It was desired in particular to continue and extend the examination of the causes of fœtal death which Dr. Eardley Holland undertook for the Local Government Board in 1914. His results were published in 1922. They showed that a high proportion of fœtal deaths were caused by unskilful midwifery, and drew attention to the great need for ante-natal supervision. In his conclusion he says "A generalization of great importance is that more fœtuses were killed by the complications of labour than died during pregnancy from maternal or placental disease," and "I have always thought that syphilis as a cause of fœtal death has been given an exaggerated prominence, and that precise work on a large material would unmask its pretensions."

After the close of war the Medical Research Council had thought it highly desirable to support at once an inquiry upon similar lines, not limited to London cases but extended to suitable areas in various parts of the country. Added confirmation of the main results known to have been obtained by Dr. Holland before the ultimate publication of his report, would obviously strengthen and guide the different forces at work towards the improvement of midwifery services and the wider adoption by expectant mothers of ante-natal supervision. At the same time other data of value were to be expected from wider inquiry, likely themselves to suggest fresh problems of specific kind for more intensive attack.

In organizing these studies in 1919 the London Child-Life Committee worked in close relation to the Scottish Committee, the representatives of the two Committees most active in the selection of workers and the collation of data being Dr. Eardley Holland and Dr. J. S. Fairbrain in London, with Dr. J. W. Ballantyne in Edinburgh. The chief contributions made under this scheme are owing to Dr. F. J. Browne, Royal Maternity Hospital, Edinburgh, Dr. N. B. Capon, the Royal Liverpool Children's Hospital, Liverpool, Dr. A. M. Kennedy, and later Dr. J. N. Cruickshank at the Royal Maternity Hospital, Glasgow. The data collected at each of these centres have not only found their useful place in the present joint report but have led to other inquiries of a more intensive kind by each of the observers named, of which the results have been or will be published in this series of reports or in the technical journals.

The reports of all these observers were placed in the hands of the sub-committee already named, and Dr. Ballantyne of Edinburgh kindly undertook to collate and edit them with appropriate comment. Within a few months, however, this, with so much other valuable service, was lost by his unexpected death. Subsequently, Dr. Eardley Holland was good enough to act in his stead, under many difficulties, and was able to obtain the co-operation of Dr. Janet Lane-Claypon, working in this respect directly for the Council. Discrepancies and disparities in the material submitted from the several centres, as explained in their introduction to the present report, made it necessary for these authors to do much more than collate and edit. They had in effect to compile and write their own report upon the basis of the evidence supplied, but as marshalled again and regrouped.

The results of the collections made under this scheme have been twofold. The routine examination of dead-births led at various points, as had been hoped, to specific directions of pathological inquiry, of which many have been followed up with results published elsewhere as shown below. Viewed in the second place as a whole, as they stand after suitable grouping, they offer suggestions for immediate practical effort in preventive work. They wholly support for London, and extend to other parts of the Kingdom, the conclusions already quoted from Dr. Eardley Holland's individual inquiry for the Local Government Board. They show that a very high proportion—not less than 25 per cent. and perhaps more—of all

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dead-births are due to the accidents and complications associated with manipulation by midwife or doctor at birth, whether by forceps or version or in other ways. They show the great desirability of reducing to the minimum the occasions for interference with natural birth. They point to more and better ante-natal supervision of expectant mothers, and to the advice and safeguards that come from it, as being the true line of immediate preventive progress."

Turning to the main body of the report, the authors review in turn the incidence of the different causes of death; the conditions of the fœtus at birth, and of the condition of the mother during pregnancy and confinement; abnormal placental states; deaths due to complications of labour; intra-cranial injuries; ante-partum hæmorrhage; the toxæmias of pregnancy; deaths due to syphilis; fœtal states; deaths attributed to prematurity; and deaths from unknown causes. In their final chapter, they summarise as follows:

The data set out in this report do not readily lend themselves to a concise summary. A few notes on the chief points brought out appeared likely to be helpful to the reader, and they are now offered.

Maternal ill-health during pregnancy, and perhaps also before the occurrence of pregnancy, has been shown to be a factor which is probably of great importance in relation to the occurrence of dead-births. It is regrettable that the data as to the mother are insufficiently exact to make possible the study of the maternal mortality among the mothers of the dead-births in this inquiry. It may, however, be presumed that maternal morbidity is closely related both to fœtal and to maternal mortality.

The frequency of intra-cranial lesions is high. The percentage is not as high as that found by Holland, but the data are admittedly less detailed and the percentage incidence discloses conditions which call for serious thought. Tentorial tears were noted in just over one-fourth of all cases of fresh and neo-natal deaths in the entire series. Of these some were due to spontaneous breech labour, with in some cases, difficulty in the delivery of the arms or head; but the majority were associated with the use of forceps or with the practice of podalic version.

Although it is impossible to ascertain the precise factor which extinguished the life of the fœtus or child it can hardly be doubted that the intra-cranial lesion with its accompanying hæmorrhage was at least an important contributory cause of death. It appears, therefore, that a high proportion of intra-natal mortality is due to manipulations of some kind or another. Such manipulation is often necessary in the interests of either the mother or the child, but the present inquiry suggests that efforts should be directed towards the reduction of the need for obstetric interference.

If pelvic contraction were discovered sufficiently early before the onset of labour there can be little doubt that measures would be taken which would result in a saving of infant life and of much maternal suffering and possibly consequent ill-health. If the urine of pregnant women were examined repeatedly during pregnancy there would be less need for rapid intervention and manipulation in cases of toxæmia. Similarly, if attention were paid to the occurrence of hæmorrhage during the later months of pregnancy equally good results would almost certainly be secured, and the cases such as those described in the present report would be, in large measure at any rate, avoided.

It is recognised that it is not always easy to carry out such recommendations. The women of this country are only gradually beginning to appreciate the importance of ante-natal supervision, and some of them are not as yet prepared to accept it at all. The medical profession as a whole have, perhaps, not as yet, been aware of the value of ante-natal supervision as a prophylactic measure of a general kind, and further education of many of the practising midwives is also required.

If ante-natal supervision were effectively used by all pregnant women, many deaths such as are shown in this report would not occur, and such deaths might even perhaps be eliminated in certain of the classes considered. Such a state of affairs can, however, hardly be expected until the teachers in the medical schools and the teachers of midwives, as also the leaders of the numerous women's organizations, are convinced of the need for, and the scope of, ante-natal supervision.

The data given in the report suggest that there is great need of co-operation between the different branches of the profession concerned in midwifery work. There are many cases of neglect of hæmorrhage by either midwife or doctor, or perhaps by both, of failure to send a patient to hospital until too late to save the child, and sometimes too late to save the mother also. There are instances of women dying undelivered after prolonged labour and delay outside hospital. In a number of other equally distressing cases hospital care was sought very late.

In many of these cases it is not merely a hospital bed that is required but skilled obstetric care. With improved supervision during pregnancy no doubt the number of emergency obstetric manipulations would decrease, but even so skilled supervision would be required. It can hardly be doubted that much could be accomplished without additional cost if closer co-operation were established. The larger maternity hospitals with their staffs of skilled obstetricians could surely spread their aid and influence over a larger area than they do at present, if only the importance of the work were fully appreciated. Much thought and perhaps some sacrifices will be needed on the part of those concerned, but the medical profession and the midwives will know how to rise to their responsibilities when once they realize them.

This report is one which should be in the library of every obstetrician in India; for its applicability to conditions in this country is great.

MALARIA CONTROL IN MALAYA AND ASSAM: A VISIT OF INSPECTION, 1926-27.—By Sir Ronald Ross, K.C.M.G., F.R.S., Director-in-Chief, Ross Institute and Hospital for Tropical Diseases, Putney Heath, London, S. W. 15. Pp. 31.

THIS brochure is the brief record of a tour round Malaya and Assam in the winter of 1926-27. It is written less for the expert in malariology than for the interested layman, and contains little that the former is not already familiar with. For the latter, however, there is an excellent brief account of the discovery of the mosquito-malaria cycle, of the methods of control in general, and of the results of the more noteworthy anti-malaria campaigns of the world. It is not until the three pages of 'conclusions' are reached that the book becomes of real interest to the practitioner.

The lesson of this chapter is that it needs commercial enterprise, or a strong commercial influence in the administration of a country, before effective use is made of the author's twenty-eight year old discovery. Of the campaigns described, the Panama Canal was the work of the Federal Government of the nation which has admittedly the strongest 'commercial sense' in the world; Port Swettenham, Kuala Lumpur and Singapore are under administrations on which the commercial element is strongly represented; Ismailia and the rubber plantation campaigns of Malaya are frankly the work of commercial enterprises, concerned solely with the financial losses due to the disease; and it was to inspect the preliminary work being done on plantation areas in and around Assam that Sir Ronald paid the visit which has resulted in the present publication.

The lesson is a hard one for the rest of India. Outside Assam, the campaigns in the rest of this vast Empire are but two, the control on the Bombay Back-Bay

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Scheme, an undertaking of a commercial nature, situated in juxtaposition to a city notorious for its long continued malariousness; and the work on the Bengal-Nagpur Railway, one of the few remaining commercially controlled railways of this country. Is it, as Sir Ronald states in unfavourably comparing the condition of malaria control in Burma with that of its southern neighbour, that in the former "there is much more popular, and therefore less instructed, control of the administration,' or is it that only those connected with, or influenced by, European commerce can see that the control of the disease is a matter on which money can be expended with good hope of returns? There are dying towns in the Eastern Punjab, for instance, which, had they been situated in the Southern States of America, would undoubtedly have locally taxed themselves to do away with the menace overhanging their future existence. It seems a sad but true fact that the Indian can only hope to be adequately protected from the disease by joining the service of some large commercial concern. The reviewer has recently seen an application from a clerk employed in connection with railway construction in one of the most unhealthy tracts of India for passes for his family to his station, as that, a protected area, was less malarious than his home in Lower Bengal.

Perhaps what is wanted in India even more than further pure research into the disease is a proper investigation into, and propaganda exposition of, the financial losses due to malaria. Then perhaps we shall see legislatures and municipalities put up the money, not only for the practical application of the knowledge we already possess, but the provision throughout the Indian Empire of really adequate funds for further researches tending to cheaper, more efficient, and therefore more widely-applicable methods of control.

MALARIAL PSYCHOSES AND NEUROSES.—By William K. Anderson, M.D., F.R.F.P.S.G. London: The Oxford University Press and Constable and Co., 1927. Pp. viii plus 395, with 4 colour plates and 18 illustrations. Price, 42s. net.

IN his preface the author remarks on the fact that although malaria is the oldest disease of which we have any reliable record, there appears to be no comprehensive work dealing with its nervous manifestations: this gap he therefore proposes to fill. The present volume does not claim to be a 'one man job' so much as a compilation made up of the author's experiences, together with those of numerous other observers, British, Continental and American. Case histories occupy a considerable portion of the work.

It is impossible in a brief review to do more than touch upon the salient features. The first two chapters deal briefly with the life-history of the parasite and the clinical features of the disease. Chapter III gives an account of malaria in history, together with quotations from numerous classical writers: it is claimed that malaria played a considerable part in the decline of the Greek and Roman civilizations. In his consideration of the pathology of the disease, the author attempts to correlate the features of the malarial paroxysm and the signs and symptoms of chronic malaria with variations in functional activity of different groups of endocrine glands. Chapters VII to XX inclusive deal with the mental and nervous manifestations of malaria. Apparently any and every psychotic and neurotic manifestation may have malaria as an etiological factor. Details are given of a small number of cases shewing the syndrome of general paralysis of the insane and in which the only discoverable causative agent was malaria. Unfortunately we are not privileged to learn the author's views on the therapy of true (syphilitic) paralytic dementia by the induction of benign tertian malaria.

One of the most interesting chapters in the book is that dealing with malaria in its medico-legal aspects, shewing the part played by this disease in the causation of mental aberrations leading to criminal offences.

The work makes interesting reading, although one is left with the impression that the author is rather carried away by his subject. It would certainly be interesting to determine if possible how far the mental condition of ex-service patients confined in mental hospitals at Home can be attributed directly or indirectly to preceding attacks of malaria.

The sumptuous style of the book is in keeping with the best traditions of the Oxford Press: the colour plates are works of art, the illustrations are good, there is an adequate index and a most excellent list of references, but the price of the volume—forty-two shillings—puts it beyond the reach of any save the specialist.

J. M. H.

MANAGEMENT OF THE SICK INFANT.—By Langley Porter, B.S., M.D., M.R.C.S. (Eng.), L.R.C.P. (Lond.), and William E. Carter, M.D. Third Revised Edition. St. Louis: The C. V. Mosby Company, 1927. Pp. 726, with 72 illustrations. Price, $8.50.

THIS is one of the most enlightening works on children's diseases which we have been privileged to read. It gives a full and excellent description of the diagnosis, symptomatology and treatment of the various ailments to which infants and young children are subject. It is impossible in a brief notice of this kind adequately to do justice to a work of the size under consideration, and one must be content with a rapid survey of the salient features.

The volume is divisible into three parts. Part I deals with the significance and etiology of such symptoms and signs as vomiting, hæmorrhage, pain and tenderness, etc.; in Part II the diseases of the various systems are considered in detail; while Part III is devoted to a discussion of methods, and a consideration of formulas, recipes and drugs.

At the outset the authors stress the important part played by disturbed water-balance in the production of infantile disorders and urge the necessity of restoring this balance: in this connection it is pointed out that intra-peritoneal injection of normal saline is a rapid and safe procedure. The section dealing with hæmorrhage—particularly intra-cranial hæmorrhage—impressed us as being especially good; while under the heading of pain and tenderness, some admirably commonsense remarks are made on the part played by large down pillows and tight abdominal binders in causing infantile discomfort. The vital importance of human milk feeding of premature infants is emphasized.

Turning to diseases of the various systems, one finds under respiratory disease a most sensible plea against the wholesale removal of tonsils which are large but otherwise healthy: the authors also decry the somewhat far-fetched sequelæ of adenoids which are not infrequently alleged by over-enthusiastic laryngologists. Under diseases of the digestive system it is pointed out that anal fissure is not uncommon in infants, and should be looked for as a cause of intractable crying. In the section on diseases of the nervous system we are glad to notice an appreciation of the value of Macewen's sign in cases of altered intra-cranial pressure—especially hydrocephalus. It is perhaps noteworthy that British pædiatricians do not appear even yet fully to realise the importance of this phenomenon.

Part III, devoted largely to methods, formulas and recipes, is in our opinion wholly admirable. The young physician in particular, starting work among children, may be well up in his clinical methods, but is usually more or less 'in the air' regarding such common and necessary procedures as applying a wet pack, fitting up a croup kettle, or peptonising milk.

Errors and omissions are gratefully few. On p. 36, line 26, *plyoric* should read *pyloric*, and on p. 92, line 22, *that* has been printed instead of *than*. As a result of an error in printing the two paragraphs in the middle of p. 95 are reproduced word for word at the bottom of p. 96 and the first half of p. 97. In the section on diseases of the nervous system we did not observe any

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Spencer & Co., Ltd. (W. E. Smith's Dept.), Post Box 301, MADRAS.

Cargills, Ltd., COLOMBO.

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reference to the progressive lenticular degeneration described by Kinnear Wilson, and we think that the name of the Viennese physician is Von Economo not Econ as printed on p. 332. These are however minor blemishes which do not detract from the general excellence of the work. This is a volume which should find a place, not in the library merely, but on the study table of every practising physician.

J. M. H.

TREATMENT OF DIABETES MELLITUS.—By O. Leyton, M.D., D.Sc., F.R.C.P. Fourth Edition. London: Adlard & Son, Ltd., 1927. Pp. 99. Price, 6s. net.

WE welcome the fourth edition of Dr. Leyton's small handbook on the treatment of diabetes mellitus, as it is a very simple exposition of our present knowledge of the disease. The whole subject has been nicely condensed within 92 pages, two-thirds of which deal with the treatment of the disease.

Dr. Leyton starves his patients for about two days (during which period weak tea, soda water, and plain water in unlimited quantity are allowed), till sugar disappears from the urine and the blood-sugar falls below 0.14 per cent. Thereafter a progressive diet, for which Dr. Leyton has given various tables, is given. If by the two days' fasting the urine does not become sugar-free, the patient is investigated as to his renal threshold, and if the blood-sugar persists above 0.15 per cent. after a four days' fast, insulin is given.

Dr. Leyton has considered the details of the treatment under three heads: (1) by diet alone, (2) by diet with insulin, and (3) by other preparations, with or without restrictions in diet.

We are sure that the book will be appreciated by the general practitioner, for whom it is especially intended.

J. P. B.

Annual Reports.

ANNUAL REPORT OF DIRECTOR OF PUBLIC HEALTH OF THE UNITED PROVINCES OF AGRA AND OUDH FOR THE YEAR ENDING DECEMBER 31ST, 1926. BY LIEUT.-COL. C. L. DUNN, D.P.H., I.M.S., DIRECTOR OF PUBLIC HEALTH, UNITED PROVINCES. ALLAHABAD, GOVERNMENT PRESS.

THIS report is prefaced by two excellent diagrams, one a map showing the distribution of the public health staff, the other a diagram showing the organisation of the Public Health Department and the relations between its various component parts. The district public health staff and the local health staff are both provincialised and under the control of the Director of Public Health. District health officers are employed in the south-eastern part of the province and in a small part of the north-western portions.

There is a Board of Health for the provinces; this body as well as being advisory is entrusted with the allotment of a large amount of the funds ear-marked for sanitary purposes. Under the stimulating personality of the Director of Public Health the department continues to show remarkable all-round activity. The individual reports of the District Health Officers, and the remarks of District Officers and others on their work, bear ample testimony to their energetic efforts in rural areas. The publicity branch is now well organised and equipped with cinemas, lanterns, and posters and leaflets. Rs. 12,800 was granted by Government, Rs. 12,000 by the U. P. branch of the Red Cross Society, and Rs. 5,500 realised from District and Municipal Boards. Extensive touring, lecturing and demonstrations were carried out throughout the province and special attention was paid to instruction in schools.

The research work at present being carried on in plague transmission and rat flea distribution is now well known and further results are expectantly awaited.

The treatment of plague with bacteriophage during an epidemic in Agra proved a failure.

Endemic malaria in the U. P. appears as a definite problem and the malaria branch has some interesting work to record. The antimalarial work at the Sarda Canal Headworks is under its direct control. Quinine prophylaxis has been abandoned on account of the uncertainty in controlling it, and measures are now directed to disinfection of huts, catching early cases of malaria and treating labourers with large spleens. Classes in malariology are held at Banbassa twice a year.

Plague in the U. P. for the last three years has been active in the south-eastern districts, though several western districts are heavily infected. Evacuation and inoculation are accepted by the rural population as the best means of prevention.

Vital Statistics.—The annual complaint against indifference and inaccuracy in registration is again reiterated. Attempts are being made to get down to the lowest link, the village chowkidar, to instil into him the importance of his duties and also by the attraction of additional pecuniary reward for work well done. The 1921 Census showed a population of over 45 millions.

The birth-rate and death-rate (recorded) were 34.2 and 25.10, the former an increase, the latter a decrease, on the previous five yearly averages. The infantile mortality was 177.3, slightly over the 1925 figure.

Kanauj's Municipality by the way must be the healthiest place for children in India; it has an infantile mortality of only 8 per 1,000!

Still-births are numerous and are attributed largely to venereal disease. The question of creating an agency to deal with these diseases is under the consideration of Government.

In districts where cholera is severely endemic, a special "scheme" of sanitary control exists. Special arrangements are made for the quicker transmission of information regarding cholera cases than was possible hitherto. The hill districts of Almora, Naini Tal and Garhwal are specially liable to visitations of cholera by pilgrim traffic; they are under the special cholera scheme also.

Small-pox showed an increase. Some details of age incidence on mortality would have been interesting. In Bengal for instance the age incidence is distinctly high, pointing to fairly good primary vaccination; in Madras on the other hand the age incidence is comparatively low.

A striking table is given on page 15 comparing the numbers of deaths under various causes as contributed by the ordinary agency and by verified agency. Malaria, small-pox, and plague seem over-reported, while dysentery, kala-azar and pneumonia are under-reported.

It is interesting to note the striking differences in the amounts per head per day of drinking water given for various municipalities; Cawnpore gets 31, Agra 25, Lucknow 19, Meerut 13, Dehra Dun 9, Mussoorie 24, and Naini Tal 7 gallons.

Colonel Dunn remarks that some compulsory sanitary legislation seems necessary for sanitary progress, that propaganda and persuasion alone are going to take a very long time before they produce the much desired effect of making the villager discard his insanitary habits.

Filariasis seems widespread in many districts and there is an interesting note that many cases reported as plague may be filarial adenitis. This is worth while following up.

Goitre is endemic in certain areas and the cause of this would be a useful investigation also.

Colonel Dunn also remarks on the absurdly low fines inflicted by magistrates for sanitary offences, and the inordinate delays in proceeding with these.

A. D. S.

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ANNUAL REPORT OF THE DIRECTOR OF PUBLIC HEALTH, MADRAS, 1926. BY LIEUT.-COL. A. J. H. RUSSELL, I.M.S., DIRECTOR OF PUBLIC HEALTH, MADRAS. PRINTED BY THE SUPERINTENDENT, GOVERNMENT PRESS, MADRAS. PRICE, RE. 1.

COLONEL RUSSELL has in a few years established a firm reputation as an administrator, epidemiologist, and statistician.

His annual reports therefore are of more than usual interest. The Madras Presidency too has interesting features distinguishing it from most other provinces. It has two monsoons which exert a very definite influence on the health of the province. During both monsoons for instance does the curve of cholera rise. It further possesses a few endemic foci of kala-azar. For some years past relapsing fever has occurred regularly, its presence not having been noted previously for over a century. The population of the Presidency appear also to be peculiarly susceptible to small-pox. Colonel Russell has established a provincial health staff, the progress of which is being watched by many other provinces. He has drafted a Public Health Act for the province, which however the local government think in advance of the times. It would remedy defects of the present legislation of health matters; amendments to existing acts have however been decided on.

The old tale of indifference of local bodies in the matter of collection of vital statistics is sorrowfully retold. The figures returned show a birth-rate of 36.1 per mille and a death-rate of 25.6. The infantile mortality rate was apparently higher than in previous years, being nearly 190 per 1,000 registered births.

Cholera and small-pox mortality were much reduced in 1926, but the mortality from dysentery and diarrhœa showed an almost equal rise. Colonel Russell is of opinion that endemic centres of cholera exist in the Presidency, especially in the deltaic taluks of the northern part of Tanjore District. A very interesting map showing mortality from cholera for the last 45 years is given. This area has been chosen for trial of Besredka's bilivaccine. Inoculation experimental work seems to have proved the efficacy of anti-cholera vaccination quite clearly, the case rate and the mortality rate being 3.3 per cent. and 1.1 per cent. as against 18.6 per cent. and 6.2 per cent. in unprotected groups. Government propose to give anti-cholera vaccine free to local bodies. Colonel Russell's recent papers on the epidemiology of cholera are well known, and his method of forecasting by "expectancies" has been found satisfactory.

Small-pox, though diminished in mortality during 1926, is nevertheless a serious problem. It is disquieting to find that primary vaccination is very defective, 78 per cent. of the mortality being in children under 10.

Plague is epidemic in few places. Inoculation seems to have been well received.

Malaria is a serious factor in many districts. Government has agreed to appoint a special malarial officer to the department. Relapsing fever is still present among the poorer classes, but nowhere assumed epidemic proportions.

Rural sanitation is one of the greatest problems of improvement of Indian Public Health and an interesting experiment has been carried out in Usiliampatti Union. Pit latrine and the "Java" patterns have been successfully introduced into the villages and apparently have "caught on."

The ankylostomiasis bureau continued their investigations. Infection is greatest where rainfall is highest; in dry districts the infestation is low.

There is an interesting note on epidemic dropsy in Ganjam District. Every year there seems to be an outbreak here in the dry hot months, subsiding with the onset of the rains. These are unusual phenomena and would bear closer investigation and report. The popular belief is that the cause is *Odisimari* seed, the oil from which is used to adulterate mustard oil.

The record of work carried out by Colonel Russell and his assistants is admirable. Here is a real live organisation. It is pleasing to note that three D.H.Os were deputed for the six months' course at the Calcutta School of Tropical Medicine, and that others wish to attend the same.

A. D. S.

ANNUAL REPORT OF THE UNION MISSION TUBERCULOSIS SANATORIUM, MADANAPALLE, FOR THE YEAR 1925-26. BY C. FRIMODT-MOLLER, M.B., CH.B., SUPERINTENDENT.

THIS report follows upon the usual lines, and is illustrated by a series of interesting photographs of the sanatorium, its environs, and the types of buildings used. An introduction gives a general account of the sanatorium itself, and an appendix contains rules for admission.

Turning to the special report for the year, the total number of patients treated was 424, with a daily average of 136.49, the number of available beds being 140. The patients come from all classes and communities, and in addition to some 58 per cent. who come from the Madras Presidency, others come from all over India, including Bengal, Bombay, and Burma. Of 222 patients discharged during the year, there were 22.5 per cent. in stage I on admission; 26.1 in stage II; and 51.4 per cent. in stage III, and the high rate of recovery among severe cases is to be noted. Of cases in stages I and II, positive results—i.e., either arrest of the disease, marked improvement, or definite improvement—were obtained in 93.5 per cent. Of 114 cases in stage III, positive results were obtained in 53.5 per cent. A striking table shows that the prognosis is very much better for those patients whose sputum fails to show tubercle bacilli than in those where tubercle bacilli are found. The average increase in weight among the patients discharged was 11.8 lb.

In addition to general sanatorium treatment, artificial pneumothorax, sanocrysin, tuberculin B. E., and Dreyer's vaccine were tried.

A special attempt has been made during the past two years to obtain the after-history of the patients discharged during the first nine years of working of the sanatorium; and 842 replies were received to 1,330 enquiries. Of 807 patients discharged, 54.4 per cent. were living and well after the expiry of five years; 86 per cent. of stage I cases, 81 per cent. of stage II cases, who had shown arrest of the disease are included amongst these. Of 1,330 patients discharged between 1915 and 1924, 54.6 per cent. were living and working. Of those who died after discharge from the sanatorium the great majority died within the first year after discharge, and deaths occurring more than six years after discharge are very rare. The conclusion come to is that sanatorium treatment is as efficacious in India as in the West,—if indeed it is not even more so, considering the poor physique of the patients admitted and the Indian slums from which so many of them come.

Of other features of the work mention may be made of the training of government medical officers and of medical students from the Medical Missionary College for Women at Vellore. Three papers were published in the medical journals during the year and public lectures given. During the year, the *x*-ray building was finished and the apparatus is now being installed; two new semi-general wards were constructed; and the laboratory building—funds for which were collected by the Lee Memorial Mission—is nearing completion. The total income during the year was Rs. 1,01,981, of which government contributed Rs. 26,772, whilst Rs. 75,209 were received by way of fees from patients or subscriptions from missions and donations: the total expenditure was Rs. 1,00,485. The building fund is raised almost entirely by mission subscriptions and donations. The Sanatorium in fact is almost entirely dependent upon voluntary support; whilst the splendid work which it is doing has often been commented on in our columns.

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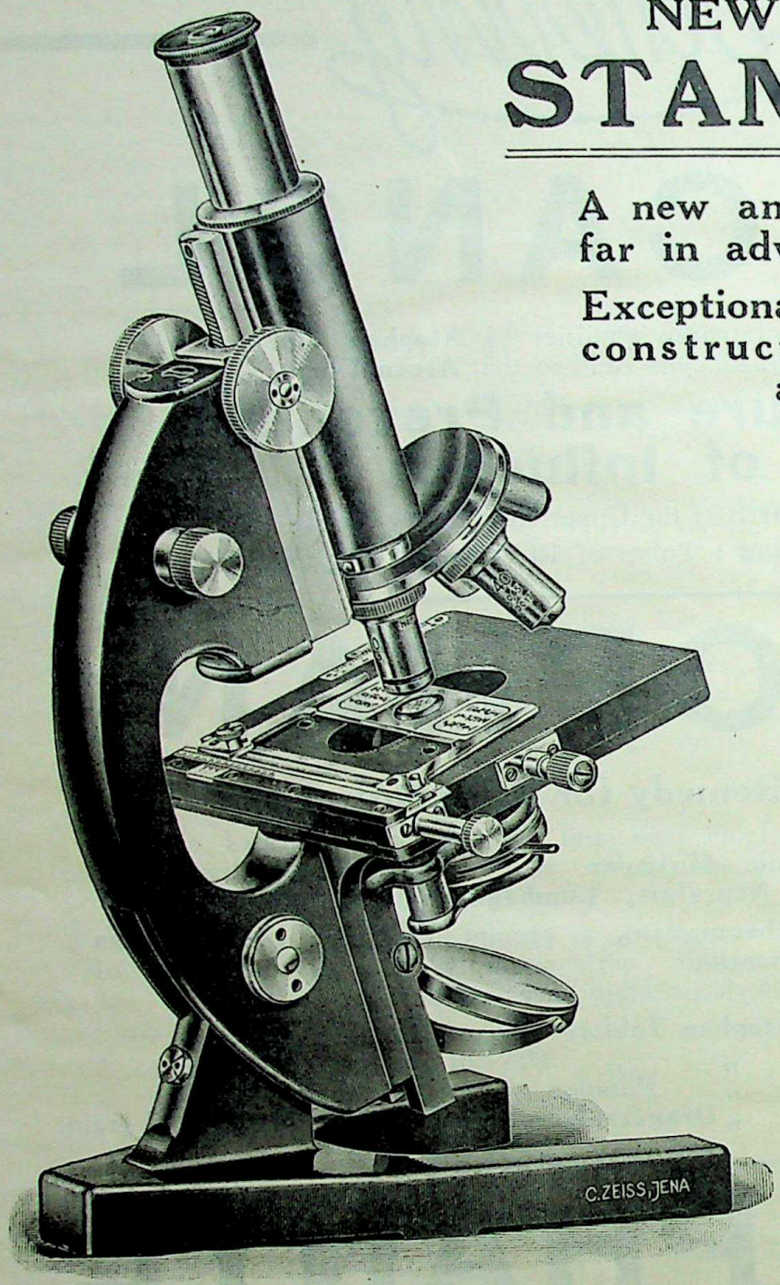

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ANNUAL REPORT OF THE CHEMICAL EXAMINER'S DEPARTMENT, BENGAL, FOR THE YEAR 1925. BY HIRALAL SINGH, B.A., L.M.S., OFFG. CHEMICAL EXAMINER TO THE GOVT. OF BENGAL. CALCUTTA, BENGAL SECRETARIAT PRESS. PRICE, RE. 1-6-0.

WE very much regret the delay in reviewing this report, a delay which is due solely to the extreme pressure upon our available space.

Major T. C. Boyd, I.M.S., held charge as Chemical Examiner to the Government of Bengal until September 19th, 1925, when he went on a year's leave, and Dr. Hiralal Singh took over charge. During the year under report 6,378 articles were examined as against 5,419 in the previous year—an increase of 959 articles. During the year certain important matters were discussed, such as proposed draft rules under the Indian Poisons Act for the dispensing of liniments, embrocations, and lotions; a scheme for the reorganisation of the staff of the department with a view to the more efficient carrying out of the dual functions of Chemical Examiner and of Professor of Chemistry to the Calcutta Medical College; and a plea for the re-installation of the telephone, which had been "axed" in 1924. (Surely if there is one officer who should be on the telephone it is the Chemical Examiner, who has such important medico-legal examinations to make, and whose opinion may be called for on the question of explosives, or his presence suddenly demanded at a search by the police.)

In the general analytical department 2,223 examinations were carried out as against 1,642 in 1924. The more important articles examined were samples of opium, cocaine, drinking water, milk—of which 5 out of 13 samples were found to be suspicious,—mustard oil, *ghi*, articles in connection with forgery and counterfeit coining cases, and explosives. Of opinions called for, advice was asked with reference to the inclusion of certain patent medicines in the official Schedule of Poisons; as to the cause of rapid corrosion of the tube plate of a boiler; as to the cause of turbidity in antimony solutions intended for intravenous administration in cases of kala-azar; regarding the purity of certain samples of chloroform: and as to methods of purification of peptone for bacteriological purposes.

In the medico-legal department 1,896 cases were referred as against 1,816 in 1924; of which 1,048 came from the Government of Bengal and the rest from other provinces. In fatal human poisoning, as usual, the commonest poison detected was opium—in 14 per cent. of cases. In the majority of cases sent for opinion the medical officers who forwarded the viscera withheld their opinion as to the cause of death. The chief poison detected in cases of animal poisoning was arsenic, whilst aconite and mercury were also employed. Suspected blood stains examined numbered 1,725; blood was detected in 1,073 of these, and proved to be of human origin in 872 instances.

The report includes several interesting cases of special medico-legal interest, from which we quote the following:—

Human Poisoning.

1. *Atropine (dhatura)*—(1) *Fatal cases.*—In a case reported by the Assistant Surgeon, Begusarai (Monghyr), a child aged about 5 years and his grandmother, aged about 50 years, who were sleeping together at night, were found killed by cut-throats. Atropine was detected in the viscera of the grandmother. No poison was detected in the viscera of the child. Apparently the grandmother was first drugged and rendered senseless with atropine.

(II) *Non-fatal cases.*—Atropine was detected in the stomach washings of a number of persons who were rendered senseless by partaking of sweetmeats and cold drinks offered by *fakirs* and strange visitors and then robbed of their valuables. They were removed to hospitals and recovered after proper treatment. Such cases were forwarded from Howrah as well as from Calcutta.

2. *Aconite*—(*a*) *In quack medicines.*—The Coroner of Calcutta forwarded the viscera of a man who died after partaking of some herbs to cure his syphilis. The poison was detected in the stomach washings, in the herbs, as well as in the stains on the curry-stone on which the herbs had been ground.

(*b*) A similar case was received from the Civil Surgeon, Gaya.

(*c*) In another case forwarded by the Civil Surgeon, Shahabad, six persons took some country medicines, and all suffered from symptoms of poisoning. Three succumbed. Aconite was detected in the stomach wash, in the viscera and in the balls of sweetmeat-like substance said to be the medicine given.

(*d*) Aconite was detected in the viscera of a child about 2½ years old, found floating in a well, as reported by the Assistant Surgeon, Hajipur.

(*e*) The Coroner of Calcutta, forwarded the viscera and urine of a European gentleman, who swallowed two bottles of a liniment under a fit of temporary insanity and died. Aconite was detected in the viscera and in the urine too.

(*f*) Aconite has also been detected as in previous years in several cases of *pachwai* (a kind of country wine) drinking.

In many of these cases it has proved fatal, and was detected either in the viscera or in the vomited matter or in the *pachwai* or its ingredients.

3. *Arsenic.*—(*a*) The Magistrate in charge forwarded from Chaibasa the viscera of a person who had died after operation on piles and application of some medicine to the wound. Arsenic was detected in the remnants of the medicine said to have been used, but none in the viscera.

(*b*) *Arsenic with food.*—In a case reported by the Deputy Commissioner of Police, Calcutta (South District), ten men partook of *dal* and rice. They all fell ill, and were removed to hospital where three died. Arsenic was detected in the viscera as well as in the deposits on the *karai* and the *dekchi* in which the rice and the *dal* were cooked. The case was suspected to be one of ptomaine poisoning.

(*c*) *Arsenic in well water.*—The Subdivisional Magistrate of Rangpur reported that the *pucca* well of a house had been poisoned. The sample of water from the same was examined and arsenic was detected.

(*d*) Arsenic was detected in the contents of the abdominal cavity of a body from Dibrugarh with a bullet wound in the chest.

4. *Hydrocyanic acid.*—Three fatal cases, all suicides, have been reported by the Coroner of Calcutta, one B.Sc. student, one medical student, and the third who was threatened to be sued by his creditor.

5. *Strychnine* was detected in the viscera of a case with fatal, antemortem injury on the neck reported by the Civil Surgeon, Howrah, as inflicted with a heavy cutting weapon.

6. *Poison in partially cremated bodies.*—Arsenic was detected in a partially cremated body from Magura (Jessore), and oleander detected in a similar case from Balasore.

7. *Brickbats as stomach contents.*—In a case forwarded by the Assistant Surgeon of Sitamarhi (Muzaffarpur), 27 pieces of brickbats (some of pretty large size) were said to have been found inside the stomach. No poison was detected in the viscera.

CHEMICAL EXAMINER, MADRAS. ANNUAL REPORT FOR THE YEAR 1926. BY MAJOR CLIVE NEWCOMB, D.M., F.I.C., I.M.S. ISSUED AS GOVT. OF MADRAS, LOCAL SELF-GOVERNMENT (PUBLIC HEALTH). G. O. NO. 869 OF THE 5TH MAY, 1927.

MAJOR CLIVE NEWCOMB'S annual report—as usual—is full of information of value to medico-legal workers in India, and especially with reference to laboratory tests. It may therefore be better if, instead of attempting to review it, we take the following abstracts from it for the information of other workers on the same lines in India.

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The steady increase in the total amount of work done by the department still continues. In the year under report the total analyses of all kinds was 4,637 as compared with 4,227 in 1925, and an average of 3,698 per year for the previous twenty years. It is the largest number of analyses this department has ever done in a year. This increase is general and has occurred both in the medico-legal and general analyses. The most remarkable increase is again in the stain cases and articles. When I was on leave I visited the medico-legal departments of Paris and Vienna, and there I found that with much more elaborate institutions they were dealing with but a very small number of cases (at a guess less than ten per cent.) as compared to us at Madras. The Directors were in fact inclined to be incredulous—as far as politeness permitted—as to the amount of work we have to do when I described our accommodation and staff. It means, of course, that we are unable to devote so much time to each case as we should wish. It means also that we have very little time for any original research into methods for detecting poisons, and this is a subject where research is badly needed, especially in India where we have to deal with many little-studied poisons.

Human Poisoning Cases.

In the 250 cases of suspected human poisoning investigated, poison was detected in 109, giving a percentage of detections of 43.2 per cent. as against 54 9 per cent. in the previous year.

The most commonly found poison was again opium in 25 cases, but mercury and arsenic with 23 and 20 cases respectively ran it close. Amongst the more unusual poisons we had three cases in which oduvan leaves were used.

This year we had three cases of suspected poisoning by a plant called in this part *oduvan* (Tamil) and of which the botanical name seems to be "Cleistanthus collinus, Berth." Extracts from the leaves from this plant are said in W. Dymoch, *Pharmacographia Indica*, pages 269-270, to give a purple with strong sulphuric acid discharged on addition of alkaline dichromate and a blue with nitric acid changing to green. In this laboratory we have not found these tests to work, but we have found that an acid ether extract gives a very marked green with strong hydrochloric acid and produces paralysis and death if given subcutaneously to a frog. These tests, of course, cannot be taken to identify the poisonous substance of the plant, but taken together with the shape are fairly characteristic of the leaves. In all the three cases leaves were sent amongst the miscellaneous articles. As their shape was that of known *oduvan* leaves and they gave the above tests they were reported as probably *oduvan* leaves. We did not, however, succeed in obtaining any characteristic reactions from the viscera which were sent in these cases.

Dr. Rajagopal Nayudu, while acting as First Assistant Chemical Examiner, made some investigations of the test for yellow oleander, a fairly common poison in Madras. In addition to physiological tests, the colour tests commonly used for yellow oleander are the blue colour on boiling with dilute hydrochloric acid, and the cherry red with strong sulphuric acid. Dr. Rajagopal Nayudu has got indications that these tests are given by different substances—which of these, if either, is thevetin, is not clear.

From an evaporated alcoholic extract of the kernels taken up in water and of neutral reaction—

(1) Petroleum ether extracted an oil. On making acid,

(2) Ether extracted a poisonous white crystalline substance which gave the cherry red test but not the blue.

(3) Chloroform extracted traces of the same substances as ether.

(4) Amyl alcohol extracted another poisonous substance which gave the blue test with dilute hydrochloric acid and with strong sulphuric acid a play of colours.

If the kernels are boiled directly with dilute hydrochloric acid, the blue colour can be completely extracted by amyl alcohol but not by chloroform or ether. This blue substance is poisonous. This work was only done at odd times and is only preliminary. It is hoped to continue it.

Animal Poisoning Cases.

In the year under report we had 41 of these cases with 136 articles against 42 cases with 160 articles in 1925. Poison was detected in 18 cases—43.9 per cent. as against 38.1 per cent. in the previous year. Arsenic and yellow oleander are by far the most common animal poisons, with eight cases each. In one case nux vomica was used and in one both yellow oleander and dhatura.

Stain Cases.

In 1926 we had 545 stain cases with 2,231 articles, both these numbers being higher than ever before. It is very remarkable how rapidly the number of stain cases is increasing. Ten years ago (in 1916) we had 256 cases with 910 articles and twenty years ago (in 1906) 105 cases with 396 articles, so that the number has doubled in ten years and is nearly five times as great as twenty years ago. It cannot mean that there are five times the murders in the Presidency that there were twenty years ago, but only that in the investigation of the murders a routine has become established—and very rightly—of sending anything blood stained, or suspected to be blood stained, to the Chemical Examiner.

Miscellaneous Medico-Legal Cases.

Of these cases there were 19 with 67 articles against 21 with 57 articles in 1925. The number of bomb cases has considerably diminished the last two years, and in the year under report only six came to us. Bombs are always uncomfortable things to handle and open, and from selfish considerations alone this reduction in their numbers is viewed with satisfaction by the members of the department.

In one of the bomb cases a man was killed while sleeping on his own bed on the roof of a hotel. Some enemies had apparently introduced into his bedding a bomb containing the usual mixture used in Madras which explodes on percussion or friction, and his turning about in bed during his sleep had sufficed to set it off. Various parts of the bed and clothing were sent to us, badly charred, but we easily detected arsenic in them indicating that the bomb was of the usual type containing *inter alia* sulphide of arsenic. The victim died almost immediately and presumably never knew what hit him.

In two other cases the bombs were not quite of the common type. In one of these nitro powder was added in addition to the usual explosive mixture. In the other the constituents were so coarsely powdered, whether by carelessness or design is not clear, that instead of exploding, the bomb on percussion merely caught fire and burnt rather vigorously.

In one case, originally sent to us as a bomb case, I suspect a practical joke. A woman threw what looked like a bomb at a man friend, or enemy, of hers and hit him in the back, but no explosion took place. The supposed bomb was carefully collected and sent to us with all precautions, but on opening it was found it contained nothing more harmful than a lump of lead wrapped in cotton cloth.

In another of these miscellaneous cases burnt, or partly burnt, bones were sent to us to determine if they were human, as a murder followed by a cremation of the body was suspected. The bones were broken up into too small fragments for us to determine from their shape whether or not they were human and we sent them to the Imperial Serologist, Calcutta. He was able, by serological tests, to decide that they belonged to a ruminant animal.

We had another case this year of an attempt at arson by throwing yellow phosphorus wrapped in damp cloth on the thatched roof of a house; the idea being that when the cloth dries the phosphorus will take fire and so set light to the house at a time when the culprit can prove a good alibi. In this case the owner of the house —a Sub-Inspector of Police—noticed before retiring for the night some strange glowworms on his roof. The

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THE NEW ERA
in the
Administration of Accessory Food Factors

By the practical adaptation in the B.D.H. laboratories of recent medical research on vitamin formation, it is demonstrated that cod liver oil as a source of supply of Vitamins A and D can now be superseded by scientific products, the vitamin contents of which are under strict control and are of exact strength.

RADIOSTOL
(Irradiated Ergosterol) (Vitamin D)

According to the "Lancet," Sept. 17th, 1927, p. 623—

"HUMAN RICKETS IS RAPIDLY CURED BY DAILY DOSES OF IRRADIATED ERGOSTEROL, THE RAPIDITY OF THE CURE EXCEEDING, IN THE OPINION OF TWO OBSERVERS, THAT ACHIEVED BY COD LIVER OIL OR DIRECT IRRADIATION."

Radiostol is of known activity. It is derived directly by irradiation of Ergosterol (a crystalline substance) under carefully-controlled conditions, and subsequently it is tested physiologically.

Radiostol is incorporated in a standardized amount in

RADIO-MALT

In Radio-Malt, Radiostol is dissolved in a tasteless oil rich in Vitamin A. This mixture is combined with Malt Extract containing the antineuritic and appetite-provoking Vitamin B. Thus Radio-Malt contains all three Vitamins, A, B and D.

Clinical evidence based originally on growth-tests made on animals in the B.D.H. Physiological Laboratories, and confirmed by physicians in general practice, testifies to the presence of optimum amounts of vitamins in Radio-Malt.

Radio-Malt contains no cod liver oil and is in no way related to it; neither is it merely a cod liver oil substitute. It is a complete and correctly-balanced preparation. It is ideal, therefore, for administration to children in tropical areas. It is recommended, also, as a general food tonic for anæmia and nervous breakdowns, and for use in convalescence after severe illnesses such as influenza and pneumonia.

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A booklet containing an interesting account of the evolution of B.D.H. vitamin products will be sent also on request.

THE BRITISH DRUG HOUSES LIMITED
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Progress in the Treatment of Constipation

AGAROL is the *original* Mineral Oil—Agar-Agar Emulsion, and has these special advantages: Perfectly homogenized and stable; pleasant taste without artificial flavouring; freedom from sugar, alkalies and alcohol; no contraindications; no oil leakage; no griping or pain; no nausea or gastric disturbances; not habit forming.

IN the treatment of no other human ill has more definite progress been made than in that of constipation. Convincing proof of this is presented by

AGAROL

a remedy that in its composition not only exemplifies the latest study and research concerning the maintenance of normal bowel function, but by its practical use corrects functional intestinal derangements with a promptness and efficiency that leave no doubt of its superiority to ordinary laxatives and cathartics.

Prepared from the most carefully selected mineral oil and agar-agar, emulsified by special processes which ensure minute division of the oil globules and exceptional stability of the emulsion, and combined in proportions which extended clinical studies have shown to closely reproduce physiological conditions in the canal, it will be easy to understand why Agarol is so potent in its action, and so persistent and far-reaching in its effects.

Every day more and more physicians are turning to Agarol, and using it in preference to the old time evacuants, because they are finding, as Lawton did from his clinical experience with over 400 cases of constipation, that it "restores normal function through physiological channels" and marks a step forward in the rational treatment of intestinal stasis.

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supposed glowworms however did not seem to be behaving quite naturally and this caused him to send a man up to investigate, when the real cause was discovered and the fire averted. Some of the phosphorus was collected and sent to us.

General Analyses.

The number of these analyses done during the year was 640 as against 497 in 1925. Out of this total 403 analyses were for departments of the Central Government (63 per cent.). The increase is due to the larger number of samples received from the Customs department (392 against 249 in 1925), and from private parties (159 against 29 in 1925), and is in spite of a drop from 117 to 10 in the number of samples sent by the Medical Stores, Madras.

We have had in the year under report to do an analysis which was new to us: the estimation of mechanical wood pulp in paper in connection with the alteration in the Customs Tariff which allows a paper containing more than 65 per cent. of this in at the lower rate of duty. For the estimation of mechanical wood pulp we adopted the phloroglucin absorption method (Cross and Beven: *Paper Making*, 1920, page 417), which we first tried out on papers sent to us by the Customs containing known percentages of this constituent. The method seemed to work well and in several cases where both we and the Chemical Analyser, Bombay, analysed the same paper, our results agreed satisfactorily.

One analysis which gave us some trouble was the examination of one lot of dye intermediaries for their identity with another lot in connection with an infringement of patent case. The method we chiefly relied on was to make a dye by diazotsing the intermediary and then examining the crystal form of the dye stuff.

The experiments on the estimation of iodine in solids, etc., mentioned in last year's report have been continued and the results of the investigation up to last July with the analyses of various soils, etc., are to be published in the *Indian Journal of Medical Research*. The principle of the method finally adopted for the estimation of iodine in soils was: heating the soil with potash to destroy the organic matter, liberating the iodine from the extract of the ignition by means of nitrose (strong sulphuric acid into which nitrous fumes had been passed), separating the iodine by shaking with an immiscible solvent (generally carbon disulphide), and estimation of the amount colorimetrically. The method although it sounds simple is full of difficulties, the chief of which is the difficulty of getting rid of the organic matter without losing iodine at the same time. The amount of potash used and the time and the intensity of the heating require careful regulation. The colorimetric estimation seems to me to be the most satisfactory part of the process, and much preferable to any method which involves conversion of the iodine into iodate and subsequent liberation of the iodine by the addition of potassium iodide. If this is done, and it is a method commonly used, one is adding a substance containing iodine (KI) from which many other things are liable to liberate the iodine, besides iodate. By reducing the volume of the extract and the amount of carbon disulphide (or other immiscible solvent used), one can detect excessively small quantities of iodine, but their accurate estimation is very difficult. Fellenberg (*Bioch. Zit.*) uses as little as 0.02 or in some cases even 0.01 c.c. of chloroform (he prefers this to CS_2) as extraction agent and estimates less than a thousandth of a milligram of iodine, but with such small quantities as this it requires a very highly trained eye to get accurate results.

In the method used in this laboratory 2 c.c. of CS_2 were generally used and with this amount down to about 0.01 milligram of iodine could be estimated. The method in any case seems to be only an approximate one, due to the difficulties in getting all the iodine and none of the organic matter into the final watery extract. Analyses of many of the samples of soils were also made by Dr. Norris of Bangalore, Mr. Nath of Coimbatore, and in the laboratory of the Rowett Research Institute of Aberdeen by the kindness of Professor Orr, each using different methods, and the results compared well enough to enable us to draw conclusions as to the connection between iodine in the soil and the incidence of goitre, but showed fairly large discrepancies for a chemical method.

REPORT OF THE CHEMICAL EXAMINER TO THE GOVERNMENT OF THE PUNJAB FOR 1925. REPORT OF THE CHEMICAL EXAMINER TO THE GOVERNMENT OF THE PUNJAB FOR 1926. BOTH BY CAPTAIN D. R. THOMAS, I.M.S. LAHORE, SUPDT., GOVT. PRINTING, PUNJAB. PRICE OF EACH VOLUME, 10 ANNAS.

OWING to the delay which has occurred in our reviewing the first of these two reports, we may take this opportunity of reviewing the reports for both years simultaneously. Captain Thomas was in charge of the department throughout both years.

Taking the 1925 report first, the figures for number of articles examined, 6,154 from 1,821 cases, shows a marked increase on the 1924 figures. The increase, as usual, was chiefly in articles sent in under the head "general analysis" and was chiefly due to an increased number of water samples from the railway department, and an increased number of cocaine samples from the police department. It is to be noted that out of 27 samples of *ghi* submitted by the municipal committee of Lahore, only 7 were found to be of good quality. The department however was able to work out suitable standards for milk and *ghi*, which have been fixed by government under the Adulteration of Food Act, the provisions of which have been extended.

In medico-legal cases the percentage of detection was very high, being 72 per cent. for human poisoning cases, 79 per cent. for cases of murder or violence, and 80 per cent. in cases of sexual offences. In 30 instances of human deaths the cause of death was apparently other than the above. In 4 out of 10 cremated bodies examined mercury was detected. The commonest human poisons employed were opium—33 per cent.; arsenic—20 per cent.; dhatura—16 per cent.; and mercury—14 per cent. The Chemical Examiner notes that the custom of washing out the stomach with potassium permanganate solution in cases of suspected opium poisoning, and of sending samples of viscera in suspected cases of phosphorus poisoning in spirit renders it impossible to detect these two poisons.

1,685 stain cases were received, and 694 suspected blood-stained articles forwarded to the Imperial Serologist in Calcutta for examination. The custom of making a preliminary examination for blood in such cases and only forwarding such cases as are really suspicious has saved much work in the latter department, and expenditure on the part of the Punjab Government. Human blood was detected in 608 of the 694 articles sent, and a system has been introduced by which the Imperial Serologist sends duplicate copies of all his reports relating to the Punjab to the Chemical Examiner of that Province, where they constitute a permanent medico-legal record for the province.

The following are cases of special medico-legal or general interest among the individual medico-legal cases quoted.

Arsenic Poisoning.

Arsenic is the commonest homicidal poison in the Punjab. It frequently happens that an excessive amount is given, with the result that the patient has symptoms of intense vomiting and gets rid of the arsenic before it is absorbed, and his life is saved. Many such cases have been recorded during the year under report.

(*a*) An unknown Hindu male corpse was found in a 3rd class compartment in Delhi Station. It was the body of a young man, well nourished, and the cause of death was not apparent. A post-mortem examination revealed typical signs of an irritant poison and arsenic was found on analysis in all the viscera. It may have been suicidal or homicidal.

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(*b*) A body was recovered in an unprotected well in Delhi, and it was presumed that the cause of death was accidental drowning. Some suspicion arose and the post-mortem report was consistent with death from asphyxia, except for some congestion of the stomach. The Civil Surgeon sent the viscera for analysis and arsenic was detected.

(*c*) Twelve persons sat down to a meal at Jhang. They all partook of some "lassi." Very soon they became ill and vomited. The vomits were preserved and in nine of them white arsenic was detected. Only one had diarrhœa. They all recovered.

(*d*) A case is recorded from Gujrat where a man was given a lump of ordinary crystalline sugar. He developed symptoms of irritant poisoning and died. Arsenic was found in all the viscera submitted.

(*e*) Seven men in the Montgomery District after eating some bread developed simultaneously symptoms of vomiting. White arsenic was found in all the vomits, as well as in the remaining loaves.

(*f*) A young girl of nineteen years old, in order to get rid of an illegitimate child, procured the aid of an abortion monger. On post-mortem examination the fundus of the uterus was found ruptured, with a fœtus protruding into the abdominal cavity. Analysis of the stomach, liver and kidney proved that arsenic was present. Probably this arsenic had been absorbed from the uterus, which unfortunately was not sent.

(*g*) A case is recorded from Sheikhupura where a man was given arsenic and he developed all the arsenical symptoms. Ten days later he contracted pneumonia and on the 4th day of pneumonia died. Arsenic was found in all the viscera. He was probably convalescing from his poisoning when pneumonia intervened. Although pneumonia was the immediate cause of death, the previous administration of arsenic was the predisposing cause.

Opium.

Opium, in contra-distinction to arsenic, is taken as a suicidal poison, except occasionally when accidentally given in overdoses to infants as a soporific. Prompt washings of the stomach by Civil Surgeons have saved many lives during the year.

(*a*) A case was received from Amritsar where a child of 3½ years took some opium out of his father's pocket and swallowed it. He died in eight hours and opium was detected in the viscera submitted.

(*b*) The organs of a body found in the jungle near Bhatinda were sent for report. Opium was detected. It was subsequently found that this man had a quarrel with his brothers over some land. He was known to have purchased some opium with which he must have committed suicide.

(*c*) A case of accidental poisoning occurred in Sheikhupura District where a man, to stop bleeding from dysentery, took an overdose, developed all the opium symptoms and died.

(*d*) A body was found on the upper bunk of a train at Mianwali Station by the ticket collector. 2½ *mashas* of opium were found in the pocket. All the viscera showed pathological signs of opium poisoning and opium was found on examination.

(*e*) A sweeper in Lahore who was an addict to opium took an overdose and died. He was seen by a medical practitioner and one of the symptoms was vomiting. The vomit was preserved and in it opium was found. His stomach was washed with potassium permanganate and the washings sent along with the viscera but no opium was found as Condy's fluid destroys all the opium reactions.

(*f*) Three bodies of what appeared to be Mohammedan *fakirs* were found under a tree near a canal bank in an advanced stage of decomposition. Opium was detected in the viscera of all.

Dhatura.

(*a*) A family at Palwal consisting of a husband, wife, and a son of eleven years, who were last seen at a wedding, were found dead in their own house. The door was locked. The neighbourers missing them, informed the police, who entered the house. The bodies were found buried under the floor. The viscera were sent for analysis and a mydriatic alkaloid was detected in the organs of all the three bodies.

(*b*) Four men in Sheikhupura District were given some sweets at a mosque as an offering (Niaz), and all lost consciousness. Two recovered, but found that they had been robbed of all their money. *Dhatura* seeds were found in the washings of the stomach of the recovered persons, and a mydriatic alkaloid in the viscera of the two that had died. The motive of the poisoning was robbery.

Mercury.

(*a*) A person died in Patiala very suddenly and the body was cremated at once. Suspicion was aroused and the ashes and pieces of bones were sent for analysis. Mercury was detected in the spongy parts of the bones.

(*b*) Another case was received from Patiala where the viscera had been bottled in 1921, but were not sent for analysis. They were sent in 1925 and mercury was detected in all the articles sent.

Carbon Monoxide.

The viscera of two healthy young men were received from Jhelum with the history that both, after partaking of a hearty meal, had gone to sleep in a small room with windows and doors closed. They had a charcoal "angithi" burning and there was no ventilation in the room. The post-mortem appearances suggested carbon monoxide poisoning and on spectroscopic examination the bands of carboxy-hæmoglobin were visible.

Potassium Bichromate.

A young woman in Dera Ghazi Khan was suffering from a bad cough and took some medicine given her by a travelling "hakim." She immediately developed gastro-intestinal symptoms and died in eleven hours. Potassium bichromate was found in all the organs submitted.

Case where no poison was found.

A female aged 20 years living in Dera Ghazi Khan died rather suspiciously after a few days' fever. The lambardar called for an investigation and her viscera were sent for examination. On post-mortem examination it was discovered that she had given delivery to a fairly developed fœtus. No poison was detected but twigs were found in the uterus, and there was an artificial opening in the posterior wall of the vagina into the abdominal cavity. It was a case of mechanical criminal abortion and she died of septic peritonitis.

Turning to the report for 1926, the total number of cases submitted for opinion again showed an increase—1,998 as against 1,821 in the previous year, but the total number of specimens examined, 5,967, showed a decrease as against the figure of 6,154 for 1925. No less than 508 samples of cocaine were received for examination, whilst of 75 samples of *ghi* tested only 43 were found to be of good quality. The percentage of detection in human fatal poisoning cases showed a slight falling off as compared with the previous year. As in previous years opium, arsenic, dhatura and mercury—in that order—were found to be the most common poisons used in cases of human poisoning, whilst strychnine—0·51 per cent. of the cases—comes very low down on the list. In 6 cases of suspected opium poisoning washing out the stomach with permanganate of potash solution rendered the tests for this drug useless. Stain cases numbered 1,544; and of 392 cases, 295, comprising 752 articles were forwarded to the Imperial Serologist; human blood was detected in 673 of these articles.

The miscellaneous articles examined included chiefly samples of cocaine, water, explosives, *ghi*, articles in connection with counterfeiting charges, *charas*, chloroform and lime. Of 508 samples of cocaine examined 84 showed adulteration with phenacetin, aspirin, etc. A special investigation was made of a vegetable *ghi*, called "Vanaspati"—imported from Holland, and widely sold and used in the Punjab. The fat on

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The VALUE OF RED BONE MARROW

The value of a glycerine extract of fresh red bone marrow has been known for some time. It may be pointed out that it is beneficial mainly in two ways, by improving the hæmoglobin value of the red cells and also by increasing the number of the circulating leucocytes and their opsonic power. The clinical value of this is shown by increased resistance to bacterial infection.

It should also be mentioned that the beneficial action of extract of red bone marrow in Virol is not confined to infants and children, but is useful in adults as well.

Composition

An exceedingly fine and palatable emulsion of :

Bone marrow,
Glycerine extract of red bone marrow,
Eggs,
Natural lemon juice,
Highly diastatic malt extract,
Soluble phosphates of lime, iron, etc.,

prepared in such a way as to retain unaltered the vital constituents of each of the components.

Physiological Balance

The satisfactory results obtained by the administration of Virol are due to its correct physiological balance and its *proved* vitamin content. No preparation contains all the ingredients in the same proportion, no other preparation has given the same scientific proof of its vitamin value.

VIROL

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'Byno' Hypophosphites

Trade Mark

An efficient Digestive, Tonic and Restorative

Invaluable in retarded convalescence and asthenic conditions generally.

In 'Byno' Hypophosphites are combined the tonic qualities of the Nux Vomica and Cinchona alkaloids, the restorative value of the mineral hypophosphites, and the nutritive and digestive powers of 'Bynin' Liquid Malt, which is the basis of the preparation.

'Byno' Hypophosphites has for long been prescribed with great success in convalescence after acute infections and following surgical operations; in nervous and mental conditions due to overstrain or exhaustion; as an adjunct in the treatment of tuberculosis; in asthenia of the aged, and in a diversity of conditions where a general tonic and digestive is indicated.

COMPOSITION:

Calcium Hypophosphite	2 gr.	Iron	$\frac{1}{4}$ gr.	Nux Vomica Alkaloids	
Potassium	2 „	Manganese ...	$\frac{1}{4}$ „	(equal to Strychnine)	$\frac{1}{40}$ gr.
Sodium	2 „	Cinchona Alkaloids	$1\frac{1}{2}$ „	'Bynin' Liquid Malt ...	1 oz.

In bottles containing 10 oz., 20 oz. and 40 oz.

Further particulars will be sent on request.

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examination proved to be of purely vegetable origin, but its Reichert-Meissel value was only 1.8 as against 24.32 for pure *ghi*, and it is very deficient in the vitamines essential for growth. On the other hand it is obviously a possible adulterant for *ghi*, and could be substituted for the latter article in general cooking without harm.

In an appendix to his report Captain Thomas generally discusses the question of human poisoning in the Punjab, and, as his observations are of very great interest, we take the following quotations from them.

Appendix.

Poisoning in the Punjab can be roughly classified as 30 per cent. suicidal, and 70 per cent. homicidal. Accidental poisoning is a small factor. The favourite poison selected by the suicide is opium. It is easily procured and the mode of death is not unpleasant, if not always certain. If the suicide finds that death is not sufficiently rapid, he resorts to other methods, for example, drowning or hanging. This is particularly so with females and in my opinion accounts for opuim being found on analysis in so many cases of death from asphyxia. The homicide employs as his poison in order of priority, arsenic, dhatura and mercury. A few cases of accidental poisoning take place annually from an over-dose of opium by the addicted, and from the consumption of too much alcohol by the chronic drinker.

The motive of homicidal poisoning can generally be traced to domestic, passionate, or greedy origin. Crime seems to be more prevalent in the towns than in the country districts, with the exception perhaps of crime due to violence. This is contrary to the statistics of homicidal poisoning in Great Britain. Another point of difference is the want of premeditation and the display of great craftiness by the oriental poisoner. The Indian poisoner often acts on the impulse of the moment and his methods are decidedly crude. He makes no attempt to conceal his work or to cover up his steps. In fact he is sometimes caught red-handed by the victims. He appears to act during a fit of temporary insanity.

Far more males commit crime than females, but if dhatura poison is excluded, the percentage of females using poison is greater than males. The system of cremation amongst certain sections of the community is without doubt a safety valve for many a criminal who would otherwise be brought to justice if the body could be exhumed and chemically examined. In ashes sent after cremation the only hope of the discovery of poison is from the spongy tissues of the bones which have not been completely burnt. If such bones are available, even then, examination can only be done for metallic poisons. If the day should arrive when there could be a limitation to the open sale of poisons in the Punjab, I predict a marked falling off of deaths from poisoning.

Cases of outstanding medico-legal interest.

The following have been selected as they represent cases of poisoning uncommonly occurring in the Punjab.

Tartaric Acid.

A man in Delhi went into an Indian medicine shop for some "salts" for his constipation. He obtained four tolas which he dissolved in a bottle of soda and drank. After taking this, he was seized with vomiting and purging containing blood. The excreta were sent for analysis and tartaric acid was found. The patient eventually recovered.

Salts of Lemon.

A European lady was found dead in bed in the morning with a note on a table saying she was ending her life by taking salts of lemon. An inquest was held and the visceræ were submitted for chemical analysis. Potassium binoxalate (salts of lemon) was detected in the contents of the stomach as well as in the residue in the tumbler found by the bed. The stomach was highly congested.

Solanine.

At a European hotel in a hill station, several of the residents felt decidedly uncomfortable after dinner. They complained of a burning sensation on the tongue and in the throat. Numerous articles of food were collected and sent for analysis and amongst the potatoes, pieces of a tuber called *Hath Bis* were detected. *Hath Bis* belongs to the Solanaceæ and contains an irritant poison. Subsequently more of the tuber was discovered as well as a tin into which pieces had been cut. It was not an accident.

Madar Juice.

The viscera of a man were sent in from Jhang with the history that he had committed suicide by drinking madar juice. He is stated to have died within two hours after taking the poison. On analysis the typical cauliflower crystals of madar juice were detected in the stomach and the intestines. Madar juice (milk) is obtained from the *Calotropis procera*.

Powdered Glass.

A very interesting case was received from Mandi State of a young married woman of 25 years who committed suicide by swallowing powdered glass. She died in two hours. On post-mortem examination there were no excoriations of the mouth or œsophagus, but the stomach was highly congested, especially the greater curvature. On opening the stomach, undigested boiled rice mixed with pieces of glass were found. As much as 190 grains of powdered glass were collected from the stomach and the biggest piece weighed 3 grains. It was without doubt suicidally taken in boiled rice. The small intestine was very congested and particles of glass were found adherent to the mucous membrane. The ileo-cæcal valve was intensely congested. The mucous membrane of the stomach was leathery, but in the intestine the rugæ exhibited the appearance of minute scratches under the lens and fine particles of glass were visible between the folds. The larger pieces of glass were found high up in the intestine. Death in my opinion was due to shock produced by this intense mechanical irritant in the alimentary canal.

Correspondence.

KALA-AZAR AT HIGH ALTITUDES.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—Major P. Savage, I.M.S., in the June number of your journal has recorded the apparent occurrence of indigenous kala-azar at Sanawar in the Simla Hills, where up to that time the presence of *Phlebotomus argentipes*, the suspected carrier of kala-azar, had not been reported. It is, therefore, of interest to note that in a collection of *Phlebotomus* from Sanawar village, kindly given me by Captain P. J. Barraud, F.E.S., there were several specimens of this species.

Apart from its possible relationship with kala-azar in this vicinity, it is of interest that up to the present *Phlebotomus argentipes* has not been recorded in the North of India to the West of Saharanpur in the United Provinces, and that our previous knowledge had led us to believe that this species was limited to altitudes below 2,000 feet, while the situation of Sanawar village is over 4,000 feet.

This record again illustrates the extremely localised nature of the distribution of the different species of *Phlebotomus* in an area, for although several thousand specimens of this genus have been examined during the last seven years from areas within a few miles of Sanawar, this is the first record of *Phlebotomus argentipes* from that neighbourhood.—Yours, etc.,

J. A. SINTON, V.C., O.B.E.,
MAJOR, I.M.S.

CENTRAL MALARIA ORGANISATION,
CAMP SAHARANPUR.
22nd September, 1927.

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SOME PROBLEMS IN RABIES.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—With reference to the editorial in your issue for July, 1927, on the above subject, and Dr. Turkhud's letter, the following report of an authenticated case of bite by a rabid herbivorous animal—viz., a camel—appears to be worth publishing.

Jangi Nooroo, aged 36 years, male, residing at Dungarpur, Palitana State, came to this centre on the 1st February, 1925, six days after being bitten by a rabid camel. He had deep and severe wounds on the forehead and right arm. The wounds had not been cauterised before his arrival here, but were cauterised when he arrived at this hospital. The man had one injection (only) of antirabic vaccine, and subsequently did not turn up. The Palitana State authorities were communicated with, and the man advised to finish his course of treatment, but he did not do so, nor was he treated at any other centre.

After the publication of your editorial, I communicated with the Palitana State authorities, who informed me that on the 5th of August, 1927, the man was alive and in good health. Had the bites been inflicted by a non-herbivorous rabid animal, I think that the man would have developed hydrophobia, for the bites were severe and deep, and some of them were on the head.

It may be mentioned that the camel in question, before it was shot, inflicted ghastly wounds on many persons, one of whom was bitten into the left lung, and who died shortly afterwards. Unfortunately I could get no particulars about the other patients, whether they were treated at other centres or not, and with what results. The patient in question was the only one of them who came to this centre.—Yours, etc.,

L. F. HENRIQUES, L.M. & S.
Officer in charge.

WEST HOSPITAL, RAJKOT.
16th September, 1927.

TWO CASES OF SNAKE BITE.
A PLEA FOR THE MORE EXTENSIVE USE OF ANTIVENENE.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—In June 1927, as Medical Officer of the North Anantapur Gold Mines, I met with two cases of snake bite (perhaps not due to cobras) which were successfully treated by a combination of Sir Leonard Rogers' method and antivenene as prepared by the Central Research Institute, Kasauli.

Case 1.—M., *æt.* 35, a coolie, whilst preparing to go down the pit at 11 p.m. on a dark night was bitten at the pit head by a snake which escaped into a heap of stones nearby. He was immediately brought to hospital, and I saw him within half an hour of the bite. The marks of fangs were clearly visible on the dorsum of the right foot on the little toe. The foot was swollen and blue, and the patient perspiring and dull.

The site of the bite was incised and bled freely; it was packed with a pinch of permanganate of potash and bandaged aseptically. Forty c.c. of antivenene, an amount fortunately in stock, was given subcutaneously in the flanks. To satisfy the patient a dose of the usual stimulant mixture was also given by the mouth. He was kept in hospital overnight, and when seen next morning was cheerful, and said that the aching pain had disappeared. After two days' rest he returned to work, and the incised wound healed in time.

Case 2.—S., *æt.* 20, wife of a reddy in a neighbouring village, was bitten at about 7 a.m. when picking firewood in a dark corner. The snake, which was killed, was reported to be about a yard in length and not to be a cobra. I saw her at 10 a.m. Four fang marks were visible on the dorsal aspect of the web between the right thumb and index finger, the palm and wrist being swollen and blue. The patient, whom I knew to be of a lively disposition, was sleepy, dull, and lethargic. She was treated in exactly the same manner as *Case* 1, and was sent home in the evening. She made an uneventful recovery.

Just before I took over charge, there had been two deaths from snake bite in the same village, reported to be due to the same species of snake as in *Case* 2. One of them was treated, but only with permanganate of potash, and not antivenene.

A more extensive trial should be given to antivenene, and it should be stocked in large amounts in areas infested with poisonous snakes. Its use in large dosage should lead to the saving of numerous lives.—Yours, etc.,

B. NARAYANA RAO, B.SC., M.B. (Cal.).

DEPARTMENT OF ANATOMY,
UNIVERSITY MEDICAL COLLEGE, BANGALORE.
26th September, 1927.

AFEBRILE CEREBRAL MALARIA.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—Some time ago in your columns there was a report of a case of cerebral malaria with a temperature below 100°F. Recently I have come across a similar case where the effects of malarial intoxication manifested themselves prior to any rise of temperature. The patient was a girl who had had an attack of convulsions an hour before I saw her. The convulsions were general and irregular, lasting for some 15 minutes, whilst the relatives told me that there had been foaming at the month. After they had passed off, and when I saw her, she was sobbing and crying, in which condition I found her. The temperature was not elevated, nor the spleen enlarged.

The next morning her temperature was 100° F., and she was in a completely comatose state. I took blood films and sent them to the government laboratory, and administered quinine intramuscularly. She recovered consciousness about ten hours after the injection. The laboratory report was to the effect that malarial parasites were found in the blood films; and the patient made a speedy recovery on quinine administration.

Truly, the vagaries of malaria are such that one needs to be constantly on the lookout for the disease, even when the symptoms are quite atypical.—Yours, etc.,

KRISHNALAL VITHALDAS ADALJA, M.B., B.S.

NAIROBI.
18th August, 1927.

Service Notes.

APPOINTMENTS AND TRANSFERS.

Major-General G. Tate, M.D., I.M.S., to be Honorary Surgeon to the King, Ind. Mil. Forces, *vice* Major-General R. Heard, C.I.E., I.M.S. (retd.), 27th February, 1927.

The Viceroy and Governor-General has been pleased to make the following appointment on His Excellency's personal staff, with effect from the 30th September, 1927:—

To be Honorary Surgeon.

Colonel H. Boulton, C.B.E., M.D., Indian Medical Service, *vice* Lieutenant-Colonel J. C. H. Leicester, C.I.E., M.D., F.R.C.S., F.R.C.P., Indian Medical Service, retired.

Brevet-Colonel J. Norman Walker, I.M.S., is appointed to be Inspector-General of Civil Hospitals, Central Provinces, with effect from the 15th September, 1927.

The services of Lieutenant-Colonel J. Morison, M.B., I.M.S., Officiating Director, Pasteur Institute, Rangoon, are placed at the disposal of the Government of Assam for appointment as permanent Director, Pasteur Institute, Shillong, with effect from the date on which he assumes charge of his duties.

Lieutenant-Colonel W. M. Anderson, C.I.E., I.M.S., an Agency Surgeon, on return from leave, is posted as Residency Surgeon, Hyderabad, with effect from the 8th October, 1927.

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Proc. Nat. Assoc. for Prevention of Tuberculosis, 1922.

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Lieutenant-Colonel S. R. Christophers, C.I.E., O.B.E., F.R.S., M.B., I.M.S., to be Honorary Physician to The King, Ind. Mil. Forces, and to be Brevet-Colonel, *vice* Colonel C. H. Bensley, C.I.E., I.M.S. (retd.), 15th February, 1927.

Lieutenant-Colonel J. M. A. Macmillan, M.D., F.R.C.S., I.M.S., Civil Surgeon, Simla East, is appointed to hold charge of the duties of the Civil Surgeon, Simla West, in addition to his own, during the absence on leave of Lieutenant-Colonel N. M. Wilson, O.B.E., I.M.S.

Lieutenant-Colonel J. Cunningham, M.D., I.M.S., Director, Pasteur Institute of India, Kasauli, is placed on special duty in connection with the 7th Congress of the Far Eastern Association of Tropical Medicine for a period of two and a half months, with effect from the 15th October, 1927.

The services of Lieutenant-Colonel F. A. Barker, O.B.E., I.M.S., are placed at the disposal of the Government of the Punjab, for employment as Inspector-General of Prisons, Punjab, with effect from the date on which he assumes charge of his duties.

Lieutenant-Colonel C. I. Brierley, I.M.S., on return from leave, resumed charge of the Office of Chief Medical Officer, North West Frontier Province, on the 6th October, 1927, forenoon.

The Viceroy and Governor-General has been pleased to make the following appointment on His Excellency's Personal Staff, with effect from the 17th October, 1927.

To be Surgeon.

Lieutenant-Colonel H. Hay Thorburn, C.I.E., I.M.S.

The services of Major M. D. Wadia, I.M.S., are placed permanently at the disposal of the Government of the Punjab, with effect from the 4th October, 1926.

Major L. A. P. Anderson, I.M.S., an officer of the Medical Research Department, is appointed to officiate as Assistant Director, Central Research Institute, Kasauli, with effect from the date on which he assumes charge of the duties of the appointment.

The undermentioned officers of the Medical Research Department are placed on foreign service under the Indian Research Fund Association, with effect from the 1st September, 1927, for employment as Director and Assistant Director respectively of the Central Malaria Organisation :—

Major J. A. Sinton, V.C., O.B.E., I.M.S., Assistant Director, Central Research Institute, Kasauli.

Major G. Covell, I.M.S.

The services of Major A. H. Shaikh, I.M.S., are placed temporarily at the disposal of the Government of the United Provinces for employment in the Jail Department, with effect from the date on which he assumes charge of his duties.

Major R. H. Malone, M.D., I.M.S., Officiating Assistant Director, Central Research Institute, Kasauli, is appointed to act as Director, Pasteur Institute of India, Kasauli, with effect from the date on which he takes over charge from Lieutenant-Colonel Cunningham, placed on special duty.

The services of Major H. S. Anand, I.M.S., are placed temporarily at the disposal of the Government of the Punjab, with effect from the date on which he assumes charge of his duties.

The services of Captain S. D. S. Greval, I.M.S., Officiating Director, Pasteur Institute, Shillong, are placed temporarily at the disposal of the Government of Burma for appointment as Officiating Assistant Director, Pasteur Institute, Rangoon, with effect from the date on which he assumes charge of his duties.

The services of Captain Salamat Ullah, M.C., I.M.S., are placed permanently at the disposal of the Government of the United Provinces, with effect from the 14th February, 1926, for employment in the Jail Department.

The services of Captain T. H. Thomas, I.M.S., are placed temporarily at the disposal of the Government of Bengal, with effect from the 30th September, 1927.

The services of Captain H. Das, M.B., I.M.S., are placed temporarily at the disposal of the Government of the Punjab, with effect from the date he takes charge of his civil duties

The services of Captain A. Ba Thaw, M.B., I.M.S., are placed permanently at the disposal of the Government of Burma, with effect from the 29th May, 1924.

Subject to His Majesty's approval, the undermentioned gentlemen to be temporary Lieutenants :—

Lakshman Dass. Dated 18th August, 1927.

Trilok Chand Puri. Dated 18th August, 1927.

Sher Mohmed Khan Mallick. Dated 18th August, 1927.

Rewati Raman Bakhshi. Dated 19th August, 1927.

Chandra Mani. Dated 19th August, 1927.

Amolak Singh Arora. Dated 20th August, 1927.

Yadu Nandan Lal. Dated 20th August, 1927.

Aziz Ahmed. Dated 22nd August, 1927.

Keshorao Balwantrao Gore. Dated 1st September, 1927.

PROMOTIONS.

Lieutenant-Colonels to be Colonels.

James Drummond Graham, C.I.E., M.B. Dated 6th September, 1927.

Maxwell MacKelvie, C.I.E., M.B., F.R.C.S.E., *vice* Colonel Archibald Nicol Fleming, D.S.O., M.B., F.R.C.S.E., K.H.S., retired. Dated 6th September, 1927.

Captains to be Majors.

G. B. Hanna. Dated 30th September, 1927.

P. R. Vakil, M.B. Dated 4th October, 1927.

F. M. Kirwan. Dated 11th October, 1927.

Sukumar Nag, M.B., F.R.C.S.E. Dated 10th September, 1927.

Temporary Lieutenant to be temporary Captain.

Syed Mahmood Ali Khan. Dated 15th September, 1927.

LEAVE.

The Honorable Major-General A. Hooton, C.I.E., K.H.P., I.M.S., Officiating Director-General, Indian Medical Service, is granted leave on average pay for two months and twenty-five days, with effect from the 17th October, 1927.

In supersession of Education, Health and Lands Department Notification No. 67, dated the 12th January, 1927, Colonel K. V. Kukday, C.I.E., I.M.S., Inspector-General of Civil Hospitals, Central Provinces, is granted leave, preparatory to retirement, for six months on average pay, with effect from the 15th September, 1927.

Lieutenant-Colonel N. M. Wilson, O.B.E., I.M.S., Civil Surgeon, Simla West, is granted leave on average pay for six weeks, combined with study leave for three months, with effect from the 4th November, 1927.

Major J. P. Canteenwalla, I.M.S., is granted three months' furlough, with effect from the 8th October, 1927, in continuation of the three months' leave sanctioned in Director-General, Indian Medical Service, Office Notification No. 164-A., dated 2nd September, 1927.

RESIGNATIONS.

Captain Edmund Kean, M.B., with effect from the 19th December, 1927, on the expiration of the ninety days' privilege leave granted to him.

Captain Des Raj Kehar. Dated 1st September, 1927.

The undermentioned officers are permitted to resign their temporary commissions, subject to His Majesty's approval :—

Captain Krishna Das Mukharji. Dated 23rd August, 1927.

Captain Chandrian Krishna Row. Dated 1st September, 1927.

Captain Atul Krishna Kar, M.C. Dated 1st September, 1927.

Captain Dara Hormusji Bharucha. Dated 1st September, 1927.

Lieutenant Shamsul Haque Wali Mohomed Siddiqui. Dated 7th September, 1927.

Lieutenant Des Raj Nayar. Dated 14th September, 1927.

RETIREMENTS.

The King has approved the retirement of Lieutenant-Colonel E. E. Waters, M.D., with effect from 19th July, 1927.

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NOTES.

THE SIMPLICITY OF MODERN PHOTOGRAPHY.

MANY a camera user, even though he be full of enthusiasm, works with the hobgoblin of failure ever at his elbow. In the majority of such cases it is a faulty realisation of the nature of photography that produces the never-ending crop of useless negatives and feeble, disappointing prints. The truth is that photography, although truly an art, has been built up on a scientific foundation, and, for this reason, is continually evolving. As a rule, the unsuccessful photographer is one who refuses to take advantage of the enlightenment brought about by scientific research and improve his working methods accordingly.

If any photographer needs to be convinced of the importance of the influence of science on practical photography, we advise him to get a copy of an attractive little book that has just come into our hands. The title —"Scientific Simplicity in Photography"—will appeal to all thoughtful photographers, and the contents of the booklet can certainly be commended to camera users of all grades of skill and experience.

Photography robbed of all its old bogeys and bugbears is a simple, inexpensive and delightful hobby, and in this booklet the way to the greatest possible simplification of technique is made plain. It shows why the progressive photographer has abandoned the messy and often stale solutions in cumbersome bottles for the up-to-date 'Tabloid' photographic chemicals, which make always for simplicity, cleanliness and economy. The old-fashioned darkroom is now superseded to a large extent by the modern technique of desensitising, and those who are not well acquainted with this process will doubtless find food for reflection in the details clearly set forth in this booklet. Exposure and development—two most important steps in the production of a good picture—are dealt with at length, and there are numerous tables covering all classes of films and plates. With this guide before him the adventurer along the path that leads to success in photography will escape countless pitfalls and learn how to resist the enticements of many a will o' the wisp.

Although so full of information, this book will be sent, post free, to any reader mentioning this paper and applying to Burroughs, Wellcome & Co., Post Box No. 290, Bombay.

DIGIFORTIS.

THE success which has attended the introduction of Parke, Davis & Co.'s "Digifortis," a special tincture of digitalis, into India goes to show that the want of a really reliable preparation of this character has been greatly felt in this country, and the serious conditions in which digitalis administration is called for makes it all the more satisfactory that a product which can be thoroughly relied upon is available.

"Digifortis" is prepared from leaves specially selected for freshness, colour, and activity and is physiologically standardized to a strength which is 50 per cent. greater than that of the B. P. Tincture. It is moreover fat-free, and is only available in 1-oz. amber bottles from which air has been excluded by carbon dioxide in order to ensure the better preservation of the product. Another important fact is that each bottle bears the date of manufacture, so that there can be no misapprehension on the part of any medical man as to the age of the product he is using. This is a most important point and one which will be thoroughly appreciated by the profession, for although digitalis preparations are well-known to deteriorate by keeping, the deterioration of the average tinctures in tropical climates is much more rapid than in temperate zones, as has been shown by various writers.

"BACTERIAL THERAPY."

UNDER the above title, Messrs. Parke, Davis & Co., have recently issued a booklet of about 80 pages descriptive of the various forms of bacterial medication which they list in India. Bacterial therapy now forms a most important part of the physician's daily practice and this booklet in a most comprehensive way deals with the whole subject.

The first half of the book is devoted to vaccine therapy, the introduction, pages 1 to 11, having been written by Sir Almroth Wright, M.D., F.R.S., and the remainder of the section up to the 48th page has been contributed by the staff of the Inoculation Department of St. Mary's Hospital, London. The vaccines therein described are the same as those used in their Inoculation Department, and thus, by constant observation of their effects on patients, the standard of the vaccines is maintained at a high level. This section may therefore be confidently accepted as an authoritative exposition of this branch of therapeutics.

The remainder of the book deals with bacterial products of their own manufacture, and consists of short treatises on Bacterins, Serums, Phylacogens and Immunogens which represent a new class of bacterial antigens developed in their Medical Research Laboratories in Detroit.

Physicians who are interested in this branch of therapeutics are invited to send for this booklet to Messrs. Parke, Davis & Co., Post Box 88, Bombay.

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WE are informed that an agreement has been entered into by which Messrs. Ayrton, Saunders & Co., Ltd., of Liverpool, England, have been appointed sole export distributing agents for the "Vulpo" lines (Waterproof Sheetings, Sponge Bags, Air Cushions, etc.), for the whole of Africa, Asia, Australia, New Zealand, South America and the British West Indies.

All enquiries, therefore, for exporting to these countries should be addressed to Messrs. Ayrton, Saunders & Co., Ltd., 34, Hanover Street, Liverpool, England, from whom information, catalogues, quotations and samples can be obtained.

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SCIENTIFIC Articles and Notes of interest to the profession in India are solicited. Contributors of Original Articles will receive 25 reprints *gratis*, if asked for at the time of submitting their manuscripts.

Communications on Editorial Matters, Articles, Letters and Books for Review should be addressed to THE EDITOR, *The Indian Medical Gazette*, c/o The Calcutta School of Tropical Medicine, Central Avenue, Calcutta.

Communications for the Publishers relating to Subscriptions, Advertisements, and Reprints should be addressed to THE PUBLISHERS, Messrs. Thacker, Spink & Co., P. O. Box No. 54, Calcutta.

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The Editors of *The Indian Medical Gazette* cannot advise correspondents with regard to prescriptions, diagnosis, etc., nor can they recommend individual practitioners by name, as any such action would constitute a breach of professional etiquette.

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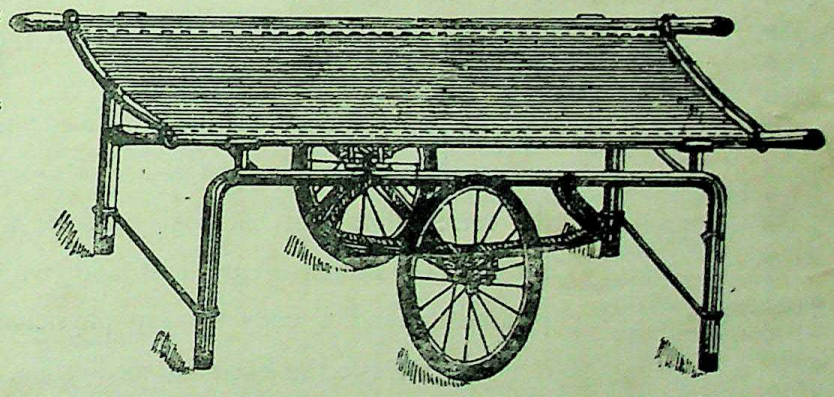

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